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ORIGINAL ARTICLES

ORTHODONTIC ANCHORAGES

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ORTHODONTISTS are very rapidly coming to realize the importance of stability and at times absolute immovability of molar anchorages, especially when considerable force is demanded to correct decided malposition of front teeth. It seems to me that there is probably no mechanical department of orthodontia that has progressed as slowly as this one. This is doubtless due to the fact that immovability of molar anchorages has not been considered for years of great importance in the general practice of shifting dentures to normal occlusion, and the correction of malalignments—always without extraction. It is also due to the habit of employing molar clamp bands which have been so highly recommended in text books and elsewhere, and which have been so extensively advertised, purely for commercial purposes.

Single molar anchorage bands employed for a retrusive or protrusive movement of front teeth, be they of the type of the commercial clamp band, or the far more efficient and sanitary hand-made bands, must be regarded as susceptible of more or less inclination movement according to the amount of stress that is put upon them, and therefore should be classed as "movable anchorages."

Every clamp-band that I have seen of the Angle type consists of a straight flat piece of banding material with screw attachments soldered to its ends and capable of being tightly clamped around a tooth. This cannot possibly fit the contour of a molar, except along a comparatively narrow zone of its circumference, for two reasons: First, the contour of the lingual and buccal surfaces of molars is quite markedly convex. Second, the zone covered by a band is appreciably smaller at the band's occlusal border than at its gingival. This is anatomically true of all teeth, except mandibular first pre-

molars. Each group of characters, i.e.,—incisors, canines, premolars, and molars—while differing from other groups in the extent of this difference between zones, there is nevertheless an exact anatomical relation in the circumferences of these two zones within each group itself, whatever the size of the tooth or teeth. Therefore, a band which has been properly crimped, soldered, and contoured, may be driven on the tooth and absolutely fit its surfaces at all points of contact. This was first published by me in full detail in "Principles of Dental Orthopedia," in 1908, and again in the last edition of this work.

Every orthodontist should appreciate the superiority and imperative necessity of accurately fitted orthodontic bands, and especially anchorage bands; not alone because they afford a more stable foundation to the force attachments and the desired stress they are intended to sustain, but what is of equal importance, pockets at the borders—especially at the gingival—for the lodgment of destructive elements of decay should be eliminated. Though clamp-bands when thoroughly cemented and drawn to place, present great apparent rigidity, their unfitted borders are danger zones for the breaking down of the cement to form pockets, or if not, the projecting gingival borders are sufficient in themselves to cause trouble, to say nothing of that most objectionable insanitary feature: the projecting clamp screw attachment.

Again, in the Angle type of clamp-bands intended to sustain arch-bows, the buccal or lingual tubes are soldered to perfect circles, and the clamp attachment is on the opposite side. Anyone can see that it would be impossible to fit perfectly the areas of these soldered places to the rhomboidal surfaces of molars, to say nothing of the mechanical disadvantage of short bearing anchorage attachments; whereas, when a buccal tube is soldered to the *fitted* tooth form of a molar band, the long bearing attachment of the tube greatly increases its stability and resistance to inclination movements, while its unsanitary influences are nil. How orthodontists continue to employ commercially made clamp-bands is something beyond my comprehension, when it is so easy to make an accurately fitted, properly contoured and festooned band that possesses no projecting insanitary borders and affords far greater anchorage stability.

When one considers some of the published teachings in regard to the labored construction of orthodontic bands, claiming they must be made upon metal models of the teeth, etc., it is no wonder that orthodontists continue to employ clamp-bands, which thus retards them from learning and practicing the true technics of band construction. In the first place, many operators do not appreciate or employ proper "banding pliers," by which they are enabled to draw the band tightly, and sharply crimp the joint to lie closely along the rounded contour of the tooth, and which alone makes it possible for the band to fit the tooth exactly. Nor do many appreciate the value of bringing the edges of the joint tightly together with proper "burnishing pliers," before soldering. Nor do many possess or appreciate the value of properly constructed "band contouring pliers." I can speak of these pliers now without being accused of commercialism, because none of them is at

present on the market. Nor have I at present any financial interest in the limitations of these pliers.

If one will carefully examine and consider the anatomical forms of molar teeth, the form and relative length of the alveolar imbedment of their roots, and the relation they bear to the alveolar ridge, and will then remember that the common point of attachment on the crown, of a pull or push arch-bow, is only about ⅕ the distance from the occluding surfaces of the crown to the apices of the roots, and that about half way between these two points is the fulcrum of the lever force—in other words the disto- or the mesio-gingival area—which according to the rule of levers of the first kind *must bear the united stress of the other two points,* he will then understand why it is that detached single molar anchorages are tipped so readily with this sort of arrangement of applied force; and he will more fully appreciate this when he considers the points upon which the force movements exert their greatest and least degree of force, i.e., first upon the mesial or disto-gingival area of the alveolus according to the direction and amount of the applied force; second, upon the contact points of the adjoining teeth upon which *they are permitted to slide;* and third, upon the apical area of the roots which lie nearest to the direction of force, which must move, if they move at all, in the opposite direction under the great mechanical advantage of a lever force.

The other two roots of upper molars and the other root of lower molars do not resist inclination movements as much, because the force and movement tend to lift them from their sockets along the line of the circumference of a circle whose center is at the point of greatest resistance, or fulcrum.

It will be seen by this also, how a comparatively light spring arch-bow will readily produce a buccal tipping expanding movement of a crown—especially an upper crown—to which it is attached.

I have endeavored to show how a single detached molar anchorage with band and attachments as ordinarily made for the application of a considerable pull or push force, exerted at right angles to the vertical axis of a molar, does not present a great amount of resistance to inclination movement. The stability of such an anchorage may of course be increased to its fullest extent by employing wide bands which are .005″ to .006″ in thickness, perfectly contoured, fitted and cemented, and which have long bearing tubes for an arch-bow or bars of a size not less than No. 16 or 17. But even with this, if much force is exerted at a considerable distance from the anchorage, the bar or arch-bow will bend, or it will spring more or less at its anchorage attachments if much force is applied, because the mechanical advantage toward tipping the tooth is so strong and is resisted so lightly by its alveolar imbedment. Bars or arch-bows less than this, say, No. 18, 19, or 22, present very little resistance to the tipping of the anchor tooth, however long the bearing of the tube attachment.

Of course these exacting principles of great anchorage stability do not particularly apply to the many cases in practice where great mechanical inertia is not so material and have no reference to the many instances published where beautiful corrections have been accomplished with hand-made apparatus through the employment of ingenious lingual anchorage attachments

constructed of alloys of gold and platinum. Nor is this article written for the benefit of those orthodontists who still cling to the theory that no teeth should ever be extracted in the correction of dento-facial protrusions, and who believe that no extensive bodily protrusive and retrusive movements are demanded to correct dento-facial malocclusion. To others who realize the very great importance of bodily movements, besides other great forces that are frequently demanded of anchorages where actual bodily movement is not required, but where immovability of the anchorages is most desirable, this article I hope will bring about a more active appreciation and application of important mechanical principles which I am sure will be found most satisfactory. Therefore, any practical principle which can be easily adopted for the stabilizing of points of anchorage in the regulation of teeth, should naturally appeal to them.

Anyone mechanically inclined understands the very great mechanical advantage of T girders over plain ones and double T girders over single ones, though constructed of exactly the same amount of material.

In like manner heavy perfectly fitted contoured bands attached to two adjoining buccal teeth with their approximate surfaces firmly soldered together, greatly increases the mechanical advantages for stationary stability over a single detached molar anchorage; and in three-band stationary buccal anchorages, stability of movement is still further greatly increased. This is due largely to the fact that the teeth cannot slide on their contact points, and consequently cannot tip unless the crown breaks loose from its cement attachment, or one end or the other of the anchorage is lifted bodily from its alveolar imbedment.

Stationary anchorages are constructed by fitting the two or three bands to the teeth, using wide banding material .005″ or .006″ in thickness, and when in perfect position, a small impression just covering the bands is taken, which enables ultimately placing them on an investment model where solder may be flowed to unite completely the interproximate surfaces and fill the lingual and buccal sulci. When a long bearing buccal tube for a bar or arch-bow is firmly soldered to these bands, so that it rests near their gingival borders, it certainly represents an anchorage of great stationary stability. And yet in an extensive practice, there are frequent occurrences where even a greater stability and immovability of the anchorages are demanded. Particularly is this true when employed for the bodily labial and lingual movements of the incisors, and possibly the canines, in phalanx.

When one understands the amount of force that is required to move a single front tooth *bodily*—the root as well as the crown—a distance that is perhaps equal to its diameter, or less, and then when this is multiplied by four or six as the case may be, and we realize that the entire magnitude of this force must react in the opposite direction to an equal degree upon the anchorages, it shows that the anchorages must possess the greatest possible stability. Therefore, for the past ten years in these special cases requiring great stability, it is a common practice with me to still further increase the mechanical advantages of stationary anchorages. This consists in soldering to the bands rootwise bars, through the medium of which the power tubes

may be located about a quarter of an inch rootwise to the gingival margins. The mechanical action of this is exactly the same as hitching the power to the root or roots themselves at that point, which anyone must see greatly increases the mechanical advantage of the anchorage apparatus toward overcoming its natural tendency to inclination movement, by placing the line of power nearer to the greatest resistance, or fulcrum; thus increasing its stabilizing quality. Other tubes and attachments for auxiliary forces are soldered directly to the bands.

A complete detail with working drawings showing technic construction of orthodontic anchorages and their practical application is published in other writings.

There are many instances in my practice where the immovability of the anchorages is indispensable to the needs of perfect correction. This refers to those cases in which I desire to move only the teeth which are producing the dento-facial deformity, and to take advantage of all the room acquired by extraction. I refer to cases of decided upper dento-facial protrusions, with the lower denture in normal relations, but with buccal cusps occluding in full malinterdigitation with the protruded maxillary teeth and which according to my experience *demand* for their perfect correction and permanency of retention, the extraction—preferably—of the first maxillary premolars. It refers also to those decided bimaxillary protrusions whose buccal teeth commonly close in normal occlusion, and which *demand* the extraction—preferably—of the four first premolars. I say "preferably" meaning that unless one or more of the second premolars or first molars are extensively decayed.

I wish to say right here, to combat some of the erroneous statements in regard to my practice and teaching, that one may read from cover to cover in my text books and will find no instance where I advocate the extraction of teeth except in cases of decided *dento-facial protrusions,* with the rare exception of those instances in which it is demanded to produce greater harmony of facial outlines, and other rare instances which arise from crowded mandibular front teeth occurring later in life which threaten pyorrhea and loss of all the lower front teeth. And particularly have I never advocated the extraction of teeth—as has often been asserted by some of my opponents—to correct malalignments of children's teeth, or to make correction seemingly easier for myself or the patients.

Now to return to the subject of stationary anchorages, they are applicable also to those decided retrusions of lower dentures in relation to normally posed mandibles in Class II, (Fig. 1) determined by a decided retrusion of the labio-mental area in connection with a normally posed prominent chin. In these cases also, as in maxillary protrusions, the lower buccal cusps occlude in full distal malinterdigitation, but in this division, with normally posed maxillary teeth though often in these cases the upper front teeth are more or less protruded.

The treatment in both of these marked divisions of Class II, consists in no attempt to shift the dentures to normal occlusion, which can easily be accomplished with the intermaxillary force, because I have found when that commonly practiced routine has been accomplished and most perfectly re-

tained for even two years and more, if the cause, as it is very apt to be, is heredity, *they will not stay in that corrected position.* This principle I fully outlined and illustrated from numerous cases in practice in a paper read before the American Society of Orthodontists, April, 1920, which was fully published with its discussion in the November, 1920, number of this journal.

The treatment of these quite common cases of lower retrusions whose lower front teeth frequently close into the gum back of the upper front teeth, and which in my classification are placed as the First Division of Class II, consists now, in first opening the bite with hollow crowns on the first mandibular molars, followed with a bodily labial movement of the six mandibular front teeth and first premolars, and retained permanently by the insertion of an artificial tooth between the premolars on each side. It will be seen, therefore, that in nearly all cases of Class II in my practice, the established (and commonly inherited) occlusion of the buccal teeth is not materially disturbed, except to perfect the interdigitation of the cusps. In this principle of treat-

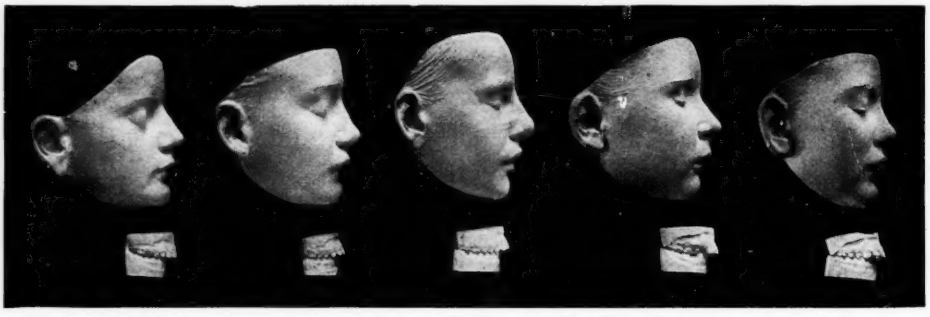

Fig. 1.

ment lies the secret of permanency of retention, and largely because nearly all of these cases arise from some form of heredity, which every one of intelligence knows is one of the most difficult things to change in every form of life.

In an extensive shifting of dentures to normal occlusion in the correction of Class II cases, we are naturally changing the positions--by inclination movement—of all the back teeth, and if these cases arise from heredity, the maxillary buccal teeth which have been shifted distally—even if it be only the first permanent molars of children—when the second molars erupt and later the third molars, that denture in nine cases out of ten, *will go back to the position originally forced upon it by the law of heredity.* And in cooperation with this movement, the lower teeth with nothing to prevent them will move back to their original occlusion.

I am fully aware of the strenuous denial that has been and will be put upon these expressions, but I have had this happen too often in my practice not to know what I am talking about, and at this moment of writing, I am consoled with the thought that it is not only true, but that the number of objecting voices are growing fewer under the influence of their own increased experiences in practice.

PRESIDENTIAL ADDRESS BEFORE THE AMERICAN SOCIETY OF ORTHODONTISTS*

By Martin Dewey, D.D.S., M.D., F.A.C.D., New York City

THIS morning it is my privilege to address you as President of the American Society of Orthodontists, which right has been given me as the result of an electoral system to which I am greatly opposed. At the time the report of my election was given out by the Board of Censors, I made the statement that I did not know whether I was elected or not because the system of mail balloting which is followed by this Society, is the most obsolete and unsatisfactory way of voting that could probably be devised. It is wrong, because the balance of power is placed in the hands of the men who do not attend the meeting. In answer to that argument, some may say that even though a man does not attend the meeting, he should be allowed to vote. However, no other society or organization seems to have taken that viewpoint, for in all large clubs, societies and fraternal orders a man can only vote when he attends the meetings or attends his club on the day of election and places his ballot in the box before the teller. Any man who is not interested enough in the Society to attend the meetings should not be given the ballot because he does not attend the meetings and is unfamiliar with the course of events, and is not able to cast an intelligent vote.

Also, this mail ballot allows considerable manipulation because it permits one man to control several mail ballots. Several years ago a ballot was sent to another member after it had been signed and the member it was sent to, voted as he thought best and then sent it to the Secretary of the American Society of Orthodontists. It is true that ballots are signed and sealed and are to be sent in a separate envelope to be opened by the Board of Censors, but even with this followed out to the letter of the law, the system is full of faults because it destroys the secrecy of the ballot.

In every organization and even under the Constitution of the United States, a man's ballot is secret, but in the American Society of Orthodontists, the Board of Censors must know how the members vote. Admitting the Board of Censors are absolutely honorable and the information which they obtain never passes out of the meeting room, nevertheless, if one member of the Board of Censors should be a candidate for any other office, he would have the decided advantage over his opponent because a great many men would hesitate to vote against a candidate when the voter knew this candidate would see the voter's signed ballot.

Furthermore, in times past, information which the Board of Censors obtained in counting the ballots in regard to who voted for a certain candidate,

*Read before the American Society of Orthodontists, Chicago, Ill., April 24-25-26, 1922.

did not always stop with the Board of Censors but sometimes the information passed to others.

As I have said before, the great fault of this system is the fact that the ballot must be signed. That destroys the secrecy of the ballot and consequently makes unsatisfactory the entire system.

If this Society is going to conduct elections in a fair and unbiased manner the election should be held at the time of the meeting, probably in the afternoon of the second day at which time the ballot box could be open for two hours, presided over by at least two members of the Board of Censors, at which time each member of the Society would place his ballot in the ballot box, unsigned and have his name checked by the presiding members of the Board of Censors at the time he voted.

It is true, as with the mail ballot, that some man or some person might influence some other member of the Society in making out his ballot, but at least each member would have to vote the ballot himself and the same could not be sent my mail for some other party to vote, as has been done in the past. I therefore stand before you today as President of your Society as the result of being elected by a system which I have condemned and which I tried to have changed before my election, and which I will continue to try to have changed, because no man under the Constitution of the United States has a right to know how any other man votes, which is always known with the system of mail balloting as practiced by this Society, where a member must sign his ballot. If the ballot was not signed, the mail system of voting would be open to such fraud that it would be condemned by every member of the Society. Furthermore, the Board of Censors should always destroy the ballots within a reasonable length of time after the election, if there are no objections or call for a recount, to prevent them from falling into other hands, and avoid anyone's obtaining information as to how some other member voted.

My experience with the American Society of Orthodontists extends over a number of years and during that time I have seen it grow from a few members to a society which has become an international power in the dental profession. From a society which had its beginning with a certain group of men, it has grown to one that is at this time, cosmopolitan. In fact, the cosmopolitan spirit of this Society is one of the things which require discussion today, and one of the problems which the Society is called upon to meet.

I am referring particularly to the object of the Society and to its membership. If you will read the Constitution of the American Society of Orthodontists, you will find the Society was formed for the advancement of Orthodontia as a science and a specialty. For a number of years the latter part of this purpose received or was considered of the greatest importance, and in fact, at the present time the question of the Society's being a society for specialists takes preeminence over that of a society composed of men interested in the study of their science. In fact, I believe the Society would have done a greater good for humanity if the profession of orthodontia had been advanced as a science and the question of the specialty allowed to take care of itself. However this is past, and what has occurred is not worth considering; we are only concerned with looking towards the future.

We have reached the point where we must decide whether this Society is going to progress along scientific lines or whether it is going to be an aristocracy composed of men who are specialists, regardless of what other qualifications they may possess.

This then brings us to a consideration of the membership. The question as to who should be members of the American Society has always received much discussion and the majority have believed that membership should be limited to those who practice the specialty exclusively. However, that qualification has nothing to do with the man's scientific standing, nor does it have anything to do with his ability as an orthodontist. Years of practice or years of specialization are now accepted as qualifications of membership and considered paramount to a man's scientific attainments or ability.

The last change made in the Constitution relative to the membership was that active members should be elected from those who had specialized three years. This is the poorest recommendation of a man's fitness that could possibly have been selected. He is not required to present any evidence as to his qualifications as a specialist or scientific practitioner. The Board of Censors does not investigate his ability as an orthodontist, but only that he shall have specialized three years. Other societies made up of scientific men not only insist that a man shall have specialized a certain length of time, but that he shall bring some evidence to show his qualifications as a practitioner. Since this Society was organized to advance orthodontia as a specialty, perhaps the three years clause is in keeping with the ideas held out by the founders of the Society.

At the time the "three year practice clause" was adopted an associate membership was also created. The associate membership was nearly unanimously adopted. I believed at that time an associate membership was a mistake, and time has proved that the associate membership has no value. It amounts to nothing and is a detriment to the Society.

Almost any man who desires can become an associate member, regardless of his qualifications as an orthodontist, if he can get two men to sign his application blank. We found when assisting the checking up of the names for the Orthodontic Directory that a lot of men were listing themselves as members of the American Society of Orthodontists, when they were only associate members. Such a listing would be unfair to the active members and the public. Personally, I do not blame the associate members, because they are compelled to pay the same membership fee that active members pay and they are denied the privilege of representation in spending the Society's money. The associate member is taxed without representation. In other words, you are taking the money of the associate member under false pretenses. You are not giving him anything, because the only privilege he has is that he can attend the meeting of the American Society, and anyone else can do the same without the payment of dues, who is interested enough to spend the time. Therefore, it is little wonder that some of the associate members have written the Secretary of this Society requesting a membership certificate which they can frame and hang up in their office. They want something to show for their money.

This proves that a certain number of men have become associate members

because of the prestige membership in the American Society of Orthodontists would give them. I believe that the associate membership should be discontinued at once and have only the active and honorary membership, and even the honorary membership must be carefully guarded.

I believe that a man, before he becomes a member of the American Society should show certain qualifications that are satisfactory to the Board of Censors or any other committee that you desire to designate. At the present time, if a man has specialized three years, he can be admitted to membership if he can get the endorsement of two active members. In times past, the endorsement to membership application has not been given the thought it deserves. Active members have endorsed application blanks for membership when they knew very little about the man they were endorsing. For instance, a man lived in Texas, had his application signed by men in Ohio or Illinois. Some men sign an application blank simply because the other fellow requests it.

Another example which came before our notice was an application blank of a man who lived in New York City, signed by a man who lived in Washington and another in Buffalo. It certainly seems to me that if the New York City man was qualified for membership, that the New York City members of the American Society of Orthodontists should be the ones to sign his application blank as they know more about him.

In considering the membership of the American Society of Orthodontists, something should be done in regard to the men in the Army and Navy who are and will be detailed for orthodontic service. We have already as a member, Col. Alden Carpenter who was elected several years ago because some of the members believed at that time that men in the Army who were interested or paying special attention to orthodontia should be eligible for membership. Col. Carpenter at that time was stationed at West Point, and was treating a large number of cases of malocclusion. Owing to the creditable results which were obtained by men trained in orthodontia during the World's War, and especially because of the wonderful work done by Dr. Eby at the Walter Reed Hospital, the Surgeon General's Office has seen fit to detail certain men to the study of orthodontia. It is the intention of the Surgeon General's Office at the present time to detail and educate about fifteen men in the Dental Corps along orthodontic lines.

At the present time, beside Col. Carpenter, whom we have mentioned as being a member of this Society, there are now three Majors who have been detailed to pay special attention to orthodontia. They are located at the different posts for the purpose of rendering such orthodontic service to the children of the Army officers as is necessary. These men, as long as they are in the Army can never be classed as true specialists in the sense that men specialize in civil life, because they are still in the Dental Corps and subject to call or assignments in whatever line of work the Surgeon General's Office deems necessary at that particular time. However, I believe that the American Society of Orthodontists should make a special ruling in regard to them and admit them to active membership.

Another thing which has been brought to my attention, is the fact that the

Board of Censors has never lived up to its duties as prescribed in the Constitution. The Board of Censors should pass on all papers and clinics that are read or given before the Society and the papers and clinics are to be turned over to the Board of Censors immediately after being presented to the Society. Also, all papers and clinics become the property of the Society. The first part of the duty of the Board of Censors, namely, passing on all papers and clinics before they are given to the Society has been almost universally neglected. A paper has been examined by the Board of Censors only when someone discovered a paper was being given that did not suit his particular view. I know of but one instance where a paper was not read because of action of the Board of Censors, and that was principally because some of the members did not agree with the essayist.

I realize that it is a difficult matter to have a paper in such shape that it can be passed by the Board of Censors before it is read. This is especially true when we deal with subjects requiring the making of lantern slides and some of the slides we wish to present may not be ready until a short time before the meeting. I have probably been one of the greatest violators of this clause, because the majority of papers which I have been supposed to give before this Society have simply been lantern slide talks. It probably would be wise for the Board of Censors to use some discretion when they invite men to read papers so that they may be able to depend upon a man's standing, and allow that to go as guaranty that his subject will be interesting.

However, the papers and clinics should be in the hands of the Board of Censors at the time of the meeting in order to facilitate the publication of the proceedings. This last year, for some reason or other, has been the worst year in my experience, so far as getting papers to the publishers. The meeting was held in April, and although the members knew that the papers were to be turned over to the Board of Censors at the time of the meeting, yet, the first of November found only half of the papers and case reports in the hands of the Editor. All are not in now.

The papers read before the Society should be delivered to the Secretary immediately after presentation because I know of several instances where the essayist has decidedly changed the construction of his paper from that given before the Society in order to meet the arguments which arose during discussion of the paper. The essayist after hearing the discussion of his paper may practically rewrite it to cover certain disputed points which the discusser brought out. In this way the value of the discussion is practically destroyed and it is exceedingly unfair to the Society and to men who gave the discussion because it renders said discussion null and void by the essayist's incorporating certain facts in his paper which were brought to light by the discusser.

In regard to discussions they always become the property of the Society, but regardless of that, members have requested that their discussion be withdrawn and not published. The Board of Censors ruled that the discussion, like the paper becomes the property of this Society. Any member who is willing to take the time of the Society to make statements which he is not willing to have published, should not be given the privilege of the floor. Another

condition which has come to light in regard to discussions is that when the stenographer's report of a discussion is sent to the discusser, in some instances he takes the liberty to absolutely rewrite the discussion adding things which he did not say at the meeting and sometimes eliminating other statements.

In one case, a discussion was rewritten twice to meet certain points that developed in other discussions. This again I consider unfair to the membership and to the essayist and other discussers. I think the Society makes a mistake when it grants an essayist the privilege to write his closing discussion after the meeting. This often is taken advantage of and the essayist in some instances prepares another paper which is again rewritten as touching on points brought out by other members during the discussion.

Owing to the fact that I was called away from the meeting of the American Society last year, the Committee on Nomenclature did not make a report. According to the minutes of the American Society, it was left to me to appoint a committee on that subject. The other two members of the committee besides myself being Dr. Lischer and Dr. Ottolengui. I made Dr. Lischer Chairman of the committee and added only the extra member. The history and reasons for the appointment of this committee are known to practically all of you.

Some of the discussions which have occurred, when attempts have been made to standardize terms, are also still fresh in your memory. Probably the greatest discussion has centered around the use of terms which characterized the types of malocclusion that are associated with arch relations. When Dr. Angle brought out his classification of malocclusion, and divided it into three classes based upon the antero-posterior relation of the mandibular teeth to the maxillary teeth, he used the numerals I, II and III. To those of us who were trained along his line of teaching, Class I, II and III presented a certain clinical picture, but the terms have no scientific value.

As a result of that, the terms, neutroclusion, distoclusion and mesioclusion were finally adopted by this Society at the meeting held at Excelsior Springs. However, Dr. Ottolengui always contended that the terms mesio- and distoclusion or mesial and distal as related to the malrelation of the arches were incorrect terms in comparison to their usage in other departments of Science.

Dr. Hopewell-Smith in the last edition of Tomes "Dental Anatomy" also called attention to the fact that what we have been calling the mesial surface of the teeth should really be the proximal surface and what we have been calling the distal surface should be called the mesial surface because it is nearer the median line of the body. However, such a change as that, while scientifically correct, would be quite confusing in the minds of the dental profession for a number of years, owing to the large usage which mesial and distal have attained. However, we as orthodontists, in our use of mesioclusion and distoclusion are scientifically wrong, because distal refers to the part of the anatomy farthest removed from the median line of the body and our distoclusion cases are cases in which the mandibular teeth have assumed a position more closely to the median line of the body than when they are in normal occlusion.

It seems to me the most logical solution would be to speak of distoclusion as posteroclusion, meaning by that a condition where the mandibular arch is posteriorly or toward the back portion of the skull or cranium as compared to its normal position. Mesioclusion would be spoken of as anteroclusion because the mandibular arch is forward. Also, instead of using the term mesiodistal relation of the dental arches, a much more descriptive term would be anteroposterior, which is also less confusing to the student and other scientists who are not familiar with the peculiarities of dental nomenclature.

The term neutroclusion, interpreted as Dr. Lischer intends it to mean, neither forward nor backward, is a good term, and I know of no better at the present time. The only confusion which arises from the term neutroclusion is in those cases which are incorrectly diagnosed, where we find a case of early extraction of the deciduous teeth; the maxillary premolars and molars have drifted forward giving a condition which some have called Class II, Division II, but which is not posteroclusion of the mandibular arch, but an anterior position of the maxillary molars and premolars. The mandibular arch is in normal anteroposterior relation with the maxillary arch judged from the greater number of teeth and anatomical structures, and we only have an anterior drifting of the molars and premolars of the maxillary arch. This condition has been rightfully described by Dr. Lischer as neutroclusion with mesioversion of the maxillary molars and premolars. That describes the pathology accurately and also outlines the treatment which must be instigated if the case is to be correctly treated. I would only change that statement of terminology by calling it neutroclusion with anterior position of the maxillary molars and premolars because I believe anterior position is more scientifically correct than mesioversion.

I would then suggest that we discontinue the use of the terms mesioclusion and distoclusion, mesioversion and distoversion and substitute anterior and posterior as being scientifically correct and more in keeping with the other sciences.

In a report on Nomenclature which Dr. Anthony gave before the Dental Editors Club of America, he stated that dentistry should have a terminology that was in keeping with other scientific societies. We should not have a separate terminology that is only understood by us, but one that can be understood by any scientific group of men. I therefore submit for the consideration of this Society and the Committee on Nomenclature, the terms which I have suggested. I will also say that the terms anterior and posterior will very probably be adopted by the Dental Editors Club of America and also by the Committee on Nomenclature which has been appointed by the National Dental Association.

The American Society of Orthodontists was the first society to adopt the use of the term maxillary and mandibular instead of upper and lower, as applying to the teeth or arches. As a result of Dr. Anthony's report before the Dental Editors Club of America, the terms canine and premolars have been adopted by that Club instead of bicuspid and cuspid. Some of you may have been aggrieved when you noticed in your published papers that the terms canine and premolar were used in spite of the fact that you insisted

upon using cuspid and bicuspid. I was doing that because first: it was scientifically correct, and second, because I am now backed by all of the other dental editors of America. It has also been called to my attention by several members that premaxillary incisor should be used instead of maxillary incisor, because there are, scientifically speaking, no maxillary incisors.

As one of the Board of Governors of the Dentists Mutual Protective Alliance, during the investigation of the Taggart patents which as some of you know has been carried through the courts for a number of years, I was impressed with the handicap that might be thrown on the practice of orthodontics if certain patents dealing with orthodontic appliances and processes were ever enforced.

One patent came to my attention which was particularly objectionable because it covered the use of the labial alignment wire, but for some reason, no attempt has ever been made to enforce that patent. However, in the future we may not be so fortunate as we have been in the past, and orthodontia may sometime find itself threatened as the dental profession was when an attempt was made to enforce the Taggart patents.

During the past year I have also investigated a number of patents which have been granted to men on certain orthodontic appliances, and find that patents have been obtained by men high in the orthodontic profession which are very similar to devices that were used for a considerable length of time before the patent was granted. Of course, we should always give every one the benefit of the doubt and possibly the men who obtained these patents were unaware of the fact that a similar device had been in use before their patents were obtained.

It is my belief that this Society should hold as high an ideal in regard to the advancement of the Science and art as is held by the American Medical Association. According to the Code of Ethics of the American Medical Association, it is considered unethical for any member to hold a patent on any device or instrument that is used in the treatment of disease and deformity. This ruling is made, realizing that if patents are obtained, the use of that device will necessarily be more or less restricted to humanity because of the price that can be enacted by the manufacturer and patentee. Everything that applies to the holding of a patent by the medical profession should apply equally well to members of this Society.

I realize the idea of patents as granted by the government was to stimulate invention in the arts and sciences and some may claim that orthodontists should be able to avail themselves of that privilege. We have no objection to orthodontists becoming inventors if they so desire, neither have we any objection to their being manufacturers and getting a patent on any instrument and device which they manufacture. However, we *do* object to their posing as professional men and at the same time trying to further their financial interests by inflicting a tax upon their profession in the way of royalty from the patent. I believe, as does the medical profession, that any man who perfects an instrument for the treatment of disease or deformity will so enhance his professional standing among the public that his increased clientele will amply repay him for any financial outlay he may have made in perfecting that instrument.

I believe that this Society cannot afford to have ideals any lower than those held by the American Medical Association, and I also believe that no man who holds a patent on any instrument or device should have a membership in the American Society of Orthodontists. We have several members who have given unreservedly their work to the profession for years, who had a good and legal opportunity to obtain patents which would undoubtedly have greatly enriched them during the rest of their lives.

I refer first to Dr. Victor Hugo Jackson. His appliance with which you are all familiar contains ideas which at the time he brought it out were patentable, and are now used by every one. However, he did not patent it and he is an example of the fact that an increased clientele, owing to the design of the appliance, has justly repaid him for any outlay he may have made.

Another case of a new and original appliance which could have been patented also, was the removable lingual wire, known to so many as the "Mershon Appliance". As a principle in the treatment of malocclusion, this could have been patented by Dr. Mershon and royalties enacted from all who used it, but he had a higher professional spirit and gave his work to the profession; yet I desire to call your attention to the fact that at least four men have taken out patents on so-called "lingual locking devices" to be used with the Mershon type of appliance.

Another member of the Society who also developed a technic which could have been patented is Dr. Lourie. I refer to the high labial arch and recurved finger-spring which he gave the profession and which fulfills a need as no other appliance does fulfill. Furthermore, his principle of the use of the lingual and labial wire in combination was also patentable, but this was given to the profession without any restriction or royalty.

I might at this time also mention some of the younger members of the American Society who have made valuable contributions in the design of appliances which they have given to the profession. I need only call your attention to Drs. Bach, Johnson, Crozat and Porter. There are a number of others whom I do not recall at this time. Some of the designs of Dr. Porter are extremely interesting because we find only a short time after he first stated his plan for the construction of his lingual lock, that an application was made for a patent to cover exactly the same kind of lock. This patent was taken out by a man who is very closely associated with a concern that also manufactures regulating appliances, and it is also a known fact that this concern which manufactures regulating appliances had a representative at the meeting of this Society where Dr. Porter first described to some of the members his square lug and square tube as a locking device for the lingual appliance.

In closing I wish to thank the Board of Censors and the various committees who have worked to arrange the program and plan this meeting. I especially wish to express my gratitude for the service rendered by the Secretary and the Board of Censors, in preparing the program. I know of the large amount of time they spent in arranging this program because of my close association with them. The success of this meeting is largely the result of the efforts of the men I have mentioned.

SOME PHYSIOLOGIC PRINCIPLES IN ORTHODONTIA*

By Martin H. Fischer, M.D., Cincinnati, Ohio

I DO not know why I was honored with an invitation to speak to you today unless it is the consequence of an address† given many years ago to my medical and dental colleagues in Cincinnati. In it I talked of some matters concerning the teeth from a physiologist's point of view which to me seemed self-evident. In this I was mistaken, for my remarks gave occasion to debate. Since that time many of the things which we regarded as differences in opinion so fundamental that they could never be reconciled, we have been able to smooth out, so that today we may safely say, I believe, that thinking dental and thinking medical men agree as to what can and what cannot be done in the mouth.

I think it hardly necessary to commend your special field. I say to my students that, if they do not know that the teeth and their proper use are of the greatest importance, to consider the bulldog, because of all the canine pets, the life span of this individual is the shortest. This is because orthodontia is not a popular form of surgical practice as applied to the bulldog. Moreover, the orthodontic surgeon is the master of a field as broad as that of many another surgical specialist. He operates upon structures as numerous as those which concern nose and throat surgeons or orthopedists and he is called upon to know and use every principle of general surgery which applies in the correction of deformity, in the maintenance of physiologic function and in the combating of infection.

1. I suppose that a medical man has been asked to address you this afternoon because at various times medical men and orthodontists have crossed scientific swords. Our professions have often enough dragged at a patient in opposite directions—the one of us to save his physiognomy and his oral physiology, for example, the other his kidney and an excretory function. But such differences in opinion cannot endure between reasonable men; they need only to come to a common understanding of what are the scientific principles which are involved, and then they will agree.

It must be understood from the outset that the medical man has no quarrel with the fundamental aims of the orthodontist. He is just as interested in the proper placing of badly erupted teeth and in the correction of malformed jaws as is the orthodontist. What differences of opinion therefore exist can only concern the means employed in the accomplishment

*Stenographic report of an address to the American Society of Orthodontists in Chicago, April 25, 1922.

†Address before the Cincinnati Dental Society, January 29, 1915, and first published in the Dental Summary, xxxv, 607 (1915) and since then with various additions in Lancet-Clinic, cxiv, 124 (1715); Oedema and Nephritis, 3rd Edition, 815 (New York, 1921) and as a monograph: "Infektionen der Mundhöhle und Allgemeinerkrankungen", translated into German by I. M. Handovsky (Dresden, 1921).

of the common ideal. The medical man has reason to believe, for example, that serious systemic disease is aggravated or induced by the things which some orthodontists do and defend. When children nowadays develop certain types of systemic disease, such as nephritis, endocarditis, St. Vitus' dance, certain nerve lesions, etc., we are obligated, through the scientific advances of the last fifteen years, to discover how these diseases enter, and, at times, the only thing coincident with such infection has been the practice of certain orthodontic procedures. Then it is that we may hear a medical man say that the orthodontic work must be stopped, and certain corrective structures be removed, while an orthodontist takes an opposite point of view.

The relation between these serious constitutional diseases and their origin is no longer a matter of debate. It is carrying coals to Newcastle to discuss the question in Chicago where our ideas of this subject have been born and developed by the patient and glorious work of Billings, Rosenow, Davis, LeCount, Leila Jackson, Irons, Woodyatt and Dick. What these men have written constitutes unquestionably the brilliant chapter of our modern medicine and its correct understanding has meant more for the relief of constitutional disease and suffering than anything else I know of in the medical world for a quarter century past. Their work has made certain the bacterial origin of diseases whose etiology was formerly mere mysticism. I will not weary you with a repetition of the obvious, but there is now no longer question of the bacterial origin of the various forms of endocarditis, myocarditis, and pericarditis; of the muscular rheumatisms, the joint rheumatisms and arthritis deformans; of the various forms of neuritis of central and peripheral origin. Infectious in origin are also gastric and duodenal ulcer, gall bladder disease with or without stone, appendicitis, many forms of acute and chronic kidney disease, certain diseases of the eye, like iritis, and various types of skin affection. For all these diseases organisms have been isolated from the affected human lesions and their inoculation into animals has reproduced the disease. Bacteriologically, the circle is therefore complete.

The bacteriological origin of other diseases is highly probable, though the proofs are not yet so binding. The whole story of arteriosclerosis with the chronic kidney disease of Bright probably belongs here and so that of metastatic pancreatitis with diabetes; various forms of organic nervous disease affecting both motor and sensory tracts belong in this class. There are the various isolated and group paralyses that we see, the tics and the many painful sensory nerve lesions. I have long held, on the basis of clinical observation and autopsy findings, to the infectious nature of many of the "insanities." I list these things because, as medical men, we face these problems daily and, if intelligent, we must ask regarding their origin. Our attitude in these practical problems is not a matter of some one's hypothesis or a blind following of some man's hobby; it is a question of doing conscientiously that which scientifically, in our present light, looks nearest right.

With these things before us a new responsibility comes to rest upon us as practitioners. We have to discover in every such instance what are the possi-

ble sources of infection. Do not imagine that I always blame the teeth. The original foci of infection may lie in the tonsils or the accessory sinuses; they may lie in infected genitourinary tracts, in hemorrhoids or ingrowing toe nails; they may lie in infected gall bladders, appendices or blood vessels which, while originally infected secondarily, have now become primary foci which seed the blood stream. I repeat these facts because it is so necessary for the skilled specialist always to see the whole human being, and the number which can do this is none too large. I say these things because, when face to face with an afflicted patient, all such sources of infection must be found, and in order to emphasize that the happy verdict of a physician that he "finds nothing" also means nothing.

After these remarks you will understand why I shall turn frequently from a consideration of orthodontic procedures in particular to those of dental surgery in general and from these to general surgery and medicine. Orthodontic surgery has set for itself a certain goal, the good purpose of which no thinking man will debate. The questions at issue are only subsidiary ones. In the march toward the common goal are mistakes ever made which, while not apparent from a purely orthodontic point of view, are disastrous from a general surgical or medical one? I think that this is the case, and we need to consider them. Instead of the absolute ideal of the orthodontic surgeon is it not better for the patient to be content at times with a half portion; or must we not, when face to face with certain established pathologic conditions, take even less, if the general health is not to suffer?

I question whether the day will ever come when the majority of our patients will not come to us because they should, but because they must. They come to us, in other words, not for prophylaxis but for the relief of established pathologic conditions. This means that the work of the orthodontist is handicapped from the start, and beset by definite difficulties. Rarely does the orthodontic patient present himself early enough, and rarely is the deformity of malocclusion the only problem in dental pathology to be met. The problem of distortion is all too frequently complicated from the start by infections in and about the teeth. It does not matter whether you hold caries to be an infectious disease per se or whether you believe it dependent upon nutritional disturbance upon which an infection becomes implanted. In either case the principles of surgery which have to be invoked are not the simple ones of aseptic procedure but the heartbreaking ones of restorative surgery in an infected area. The problem is given us and we need to meet it.

2. I believe that in order to meet properly the orthodontic problem we need to bring the principles of physiology and pathology to bear upon it. What are the teeth anyway, and what is the nature of the pathologic problems which confront us? Some of my dental colleagues grow impatient when I say that it is well to talk of the teeth as bones (which they are, a little bit modified); that the peridental membrane is better recognized as periosteum; that a tooth in its socket lined with synovial membrane is the same thing as a knee joint, an elbow joint, or any other joint of the body. Such was the

description which John Hunter gave the teeth in 1790 and it is still the best that has been given the profession. Since Hunter's day we have invoked much Greek and Latin, but as I say to my students, if it cannot be said in English, our knowledge of the subject is either vague or erroneous.

In the handling of the primary orthodontic problem—that of the proper placement of distorted and malpositioned teeth with its restoration of a more normal bite—the orthodontic surgeon deserves much credit because, almost alone among the surgeons of today, does he hold to principles of physiology as the basis for his work. Outside the field which gives his subject such popular standing—that of the building up of better facial contour, the medical value of which is quite secondary—the orthodontist strives to get teeth into proper place and alignment, and jaws contracted or expanded to the end that the function of the teeth and jaws may be properly carried on. To accomplish such result the teeth are pressed and pulled into proper position and through the bone absorption and bone deposition thus favored a better functioning of the teeth in their sockets is obtained to the end that a normal physiology may result. In these manipulations the orthodontists employ a physiologic principle which medical men and surgeons seem largely to have forgotten—namely that a normal physiology and a normal development follow only upon normal and continued use of an organ. If I may return to my bulldog for a moment, it is, of course, because of his malocclusion, his teeth unopposed and the liability of such nonworking bones and joints to atrophy and infection that his whole life expectancy is shortened and his days of systemic health are abbreviated. These constitute the reasons why orthodontic correctures when properly carried out yield such magnificent results. By getting the teeth in proper alignment and the jaws into proper relation to each other, previously unworked jaws are put into use; underpressures and overpressures between opposing teeth are restored to normal, the final result expressing itself in such a laying down of bone within the tooth itself and in the jaws as to give us the desired normal. The whole represents the best possible utilization of orthopedic surgical practice, for deformities have been corrected, and functionless or badly functioning structures have been put back to normal use. A cripple has been put on his feet once more.

Let me digress a moment. Medicine and biology are obsessed these days by an anatomical way of looking at things. Living cells, tissues and organs are looked at as things possessed of a form which determines their function. It is exactly the other way about; and the orthodontists are among the few biological thinkers who know and utilize this principle. Form is the result of functional activity and the size and quality of performance of an organ is dependent upon the degree and the amount that it is used. This is the law of Lamarck enunciated more than a century ago but forgotten or despised by the modern biologists who cut too many sections and do no experiments.

Independently of the question of infection, to which we shall come presently, are there no dangers incident to the efforts of the orthodontist? There are, I think, and we need to consider them. As I said a moment ago, it must

be kept in mind that the normal tooth is a living structure whose life is maintained through a proper blood supply, while the relationship of any tooth to the jaw is intimately associated with certain pressure effects which express themselves in bone absorptions and bone depositions in and about the tooth. When the orthodontist moves or turns a tooth he encounters two dangers. The first has to do with a possible strangulation of the afferent or efferent blood vessels bringing nutriment to the tooth; the other with the after-effects of the newly applied pressures between tooth and jaw. You utilize the principle daily that pressure leads to bone absorption in the direction in which the pressure is made. But in producing such pressure artificially you work between two extremes. Sufficient pressure must be applied to get absorption of bone in the direction in which it is wanted but this end must be obtained without danger to the blood supply of the tooth itself. Authorities in orthodontia state too often that there is no danger to be anticipated from the strangulation of the circulation to a tooth. There is to my mind great danger. Anatomical study or even casual x-ray examination of root tips will convince anyone how slight a movement in certain directions is necessary to lead to complete interference with their blood supply. The pain suffered by patients after a too rapid movement of the teeth is too commonly the symptom of a strangulated blood supply and the death of a tooth pulp. If the resulting edema of the tooth pulp is not relieved, its death follows and the death of the central portions of the dentine also. Surgically speaking, we have killed bone and such dead bone, even when given the special name of tooth, constitutes a sequestrum in the terms of general surgery. Even without superimposed infection such a tooth is a misfortune. If the strangulation has been brought about in a deciduous tooth, the eruption of its permanent successor is interfered with; if it has been brought about in a permanent tooth, there follows not only its discoloration but the half-dead tooth is brittle and its liability to secondary infection very great.

There are given here the possibilities for much reform in orthodontic practice. Bone absorptions and bone depositions occur more quickly and more effectively in young structures than in older ones. Orthodontic procedures should therefore be initiated early. In fact, it has seemed to me that corrections as carried out in older individuals nearly always fail. Individuals over twelve, and with increasing frequency as the years increase, rarely hold what has been won for them by the orthodontists. Even when gotten into better position, the necessary bone deposit needed to hold what has been gained is rarely obtained, and so in the course of a year or two the teeth slip back. In such older individuals the secondary dangers incident to orthodontic manipulation are also greatly increased. The number of strangulated pulps and consequent half-dead teeth is enormously increased, and, as I shall show you in a moment, because of the so common superimposed infections present from the start, the number of serious systemic effects also.

It has seemed to me, also, that orthodontists try to accomplish their ultimate corrections in too short periods and too often by the employment

of pressures upon isolated teeth which cannot stand such. A slow correction not only reduces the dangers of tooth strangulation but allows for bone absorption followed by bone deposition without the hazard of bone necrosis invariably consequent upon excessive or too rapidly applied pressures. Why such bad effects are more apparent in the old than the young is the consequence of differences in the bone structures manipulated,—the springy, less ossified jaws of a child, for instance, being capable of withstanding pressure and movement effects which must invariably be disastrous to the harder structures of adults.

These remarks may explain also why an orthodontic correction which depends too exclusively upon a pressure applied to but one or two teeth is the dangerous thing it is for such teeth. Correctures which apply counter pressures to the jaws are always to be preferred to those which apply such to individual teeth, because the jaws can stand what a tooth movable in its socket cannot. Where teeth must be used it is best, obviously, to use several (as many as possible) as the base toward or from which a single other tooth is to be moved.

If what I have said is correct, it is obvious that the moving of the teeth in orthodontic practice needs to be accomplished so slowly that, while pressure effects are obtained, on the one hand, which will lead to bone absorption in the direction in which we desire it, it will never be so great as to lead to strangulation of the nutrient arteries to the teeth themselves. The use of the word "great" is decidedly relative, but other things being equal, the turning of a tooth is more to be feared than monodirectional movement and the movement of a tooth through much of an arc more than the movement through a lesser one. It is for this reason that it has seemed better to me, at times, to sacrifice a portion of that principle in orthodontic practice which tries to restore every tooth and both jaws to that absolutely normal alignment characteristic of the second set of teeth. The great amount of movement of many teeth and the great expansion of the jaw demanded in heavily undershot or overshot deformities might better be met by a partial sacrifice of this absolute ideal with its lessened dangers of strangulated teeth. It is better to my mind to extract a couple of teeth and thus produce improved apposition between the remaining ones than to follow the more radical procedure with its coincident dangers.

3. The orthodontist recognizes that behind the ready-made deformity which he is asked to treat, there lie developmental difficulties through which a false relationship has been established between the first set of teeth and the second. Just how this comes about is still imperfectly understood but the orthodontist knows that at least a part of the molding of the jaw* and the proper placement of the second set of teeth is distinctly a matter of proper development, in the first place, of the first set of teeth followed by a proper development of the buds of the second set, succeeded by their proper eruption, and, finally, proper use. While we are unacquainted with the exact

*That associated with the normal or abnormal development of the nose and accessory sinuses is here ignored.

chemistry which underlies bone and tooth development we are familiar, particularly through the work of American investigators, with the food requirements without which animals cannot develop such structures properly. A far seeing orthodontist will try therefore to assure his charges such a normal background. Since tooth buds are already laid down in the jaws of a new born child, it is obvious that the orthodontist, like any intelligent physician, must start his care with the mother, seeing to it that she is furnished all necessary nutriment for the proper building up of these structures in utero. Proper nourishment must then be assured the new born child and such a background must be maintained until the last tooth has erupted. There has to be furnished, in other words, almost from the conception of the child to its adult years the necessary material out of which to build the proper machinery; the machinery once properly constructed needs then to be kept in proper use.

The problem of prophylaxis, already well met by the dentists, needs further broadening. Mother and child need food, and plenty of it; but it needs to have not only a proper quantitative composition but a qualitative one as well. It is enough to look at the things fed people, beginning with the children, and to cast one's eye over the popular hospital trays to be convinced that our dietaries call for absolutely no function on the part of the alimentary tract. If you want to know why the whole American race is constipated, it is largely because its alimentary tract is never given a job to do. Peristalsis needs not only a healthy intestinal musculature but an adequate stimulus to make it work. But how can the involuntary musculature of our alimentary tracts either develop or maintain its physiology if year in and year out it is fed pap? It is the same with the teeth. We lose our even well developed dentures because we never use them any more.

The laws of nutrition for young and old are fundamentally simple. I teach my students that the golden rule of dietetics is to eat regularly of the things one likes and all he can. This is not a joke but a categorical statement of scientific truth. Such a rule leads any but the sick to choose an abundance of protein, carbohydrate and fat and in sufficient variety to give balance to cover properly from day to day the needs of the growing or mature organism. What is it, specifically, that we need to guarantee the children? They have to have first and foremost what the scratching chick looks for. Poultry breeders furnish "scratch feed" and maple flooring to their chicks, forgetting that the poor thing is looking for a worm. Scientifically, it is looking for raw protein and that, too, is what the child needs. A second necessary element is raw animal fat,—not cottonseed oil or cocoanut oil or sterilized butter but animal fat. Professors have not always known this, but the birdies have. A bird's Christmas tree is a success if it is plentifully hung with suet and bacon. Oleomargarine and cocoanut oil venders will tell you that their substitute table fats are the chemical equivalents of fresh butter, fresh milk and fresh animal fats, but such substances lack, as you know, the necessary fat-soluble vitamines without which normal growth is impossible. Finally, we need articles of food which will prevent rickets, such

as the juices of fruits and vegetables. It does not matter whether you follow the scientific theories of one group of students or another, whether you think there are two vitamines or three or a whole flock of them. The plain English of it all is that developing children and mature individuals need for growth and for proper maintenance of their mature organism fresh food, nonsterilized food, and plenty of it.

Assured by such methods of a normal ground structure, the teeth, after their eruption need use. And how much of the substance of what we feed children or adults calls, today, for mastication? What little body is left to our denatured foods is done away with by the drinking of fluids with meals. The taking of water with meals is not bad, as so commonly taught, "because it dilutes the gastric juice." Much water improves such digestion, improves food absorption and decreases abnormal intestinal fermentation. The drinking of water, to put it plainly, is not bad for the stomach but very bad for the teeth for it sets aside their possibilities for hard and continued use.

The popular cartoons and advertisements of today show you a child holding in its right hand white bread with oleomargarine spread on thick and in its left hand a bottle of root beer. If scientific knowledge entered our daily lives, the white bread would become whole wheat bread, the oleomargarine unsterilized butter, and milk or orange juice or tomato juice would appear in the child's left hand. Is it any wonder that after a few years of nothing but denatured wheat, oats and corn with soft drinks to wash them down, the teeth get tired and jump out of the jaw?

4. We come now to the third problem which confronts the orthodontist. Not only does his patient come to him too late for adequate prophylactic care and not only is he in practice asked to correct an established maldevelopment but he is usually asked to do this in the face of an established infection in or about the mouth. I need not go into details. The orthodontist has to meet not only pathologic conditions within the teeth themselves like caries with superimposed infections, too frequently gone to the extreme of having destroyed the life of a tooth, but also extra-dental ones like infections of the peridental tissues originating either in old marginal infections or due to penetration of such through the tooth itself into the ramus of the jaw. There has been a world of nomenclature built around these different pathologic pictures—always the expression of foggy thinking and the sure background for misunderstanding regarding the principles which must guide us in their handling. I have previously insisted that the tooth is a living structure and that physiologically it is best conceived of as a living bone articulated with a second, the ramus of the jaw, the joint thus formed being lined by a synovial membrane similar to that lining any other articulation. Why, therefore, the needless terminology? When such structures are infected we have before us the pathologic states which, in plain English, are those characteristic of osteitis, osteomyelitis, arthritis and the problem of the fate of sterile or infected sequestra. I stress this point because what we need to consider in following certain orthodontic procedures is whether they

are compatible with the principles of general surgery that are summoned to our aid whenever we meet these pathologic changes elsewhere in the human organism.

Resistance to infection is greater in living structure than in dead. Therefore every effort needs to be made by the dentist to conserve the life of a tooth. It is forgotten too often that the removal of a nerve from a tooth is accomplished always by the simultaneous removal of its central nutrient artery and that such a procedure kills not only the supplied tooth pulp but the inner portions of the body of the tooth as well. What is produced is dead bone or, in the terminology of the pathologist, a sequestrum; and there is no debate among surgeons as to what is demanded in the handling of such a situation. If the sequestrum is sterile—too rare a situation in the case of the teeth—it can as such be tolerated but no general surgeon attempts today to do anything else for an infected sequestrum except remove it. As I have emphasized before, our patients come to us ready-made so that the child with carious teeth has from the start, in all probability, infected teeth and too often dead teeth. I emphasize the point because the drawing of deciduous teeth is a serious matter from an orthodontic point of view but it is also true that this type of infected tooth is the menace of the lives of too many children.

The problem which is here presented is probably the most delicate which the orthodontist is asked to meet. The death from any cause of a deciduous tooth delays its proper absorption and the eruption of the second tooth; its extraction makes for an approximation of the neighboring teeth and a probable false eruption of the second; its maintenance in the body in an infected state threatens the life and health of the child. I saw the whole story illustrated only yesterday in a child half-dead of heart disease and arthritis, the inception of the affliction coincident with the development of a "gum-boil" secondary to the caries of a deciduous first molar which a dental surgeon in the goodness of his heart had cleaned as best he could and filled, in order that maleruption and malocclusion of the adult jaw might not result.* What, in such circumstances, is to be done? The choice is not that of good from evil, but that of the least of several evils. Deciduous teeth thus infected are dangerous systemically because they harbor partial tension organisms, in other words, organisms which grow better in the absence of oxygen than in its presence. Where the attempt is made to save such deciduous teeth it should therefore be accomplished by means which will in no way favor the growth and virulence of the infecting organisms. Such teeth should be treated by an open surgical method—in other words the teeth should be drilled into, obviously dead tooth structure should be removed and the whole left open. Under such circumstances drainage is maintained and the possibility for systemic infection kept low.

Every type of filling, either root canal fillings, temporary gutta percha fillings or permanent metal fillings, are to be avoided. By sealing away organisms in the absence of oxygen all these procedures become dangerous.

*I may add that the child recovered following the extraction of this single tooth.

Root canal fillings even when carried out with the conscience and skill of a Callahan are too frequently imperfect and even when perfect are fillers merely of canals in dead bone. The attempt is made often enough to destroy the infection in such a diseased tooth by an antiseptic pack of some sort. Whatever their nature, it must not be forgotten that packs which kill organisms will kill also living tooth structure, or penetrating beyond the tooth tips, the bony structure of the jaw itself.

What I have said regarding the filling of teeth holds also, of course, when infected structures are covered by crowns, bands or other dental appliances necessary to orthodontic practice. The day of the full crown is over in general dentistry and it will soon be over in orthodontic practice. The same is true of Richmond crowns or any type of dental structure pegged into dead tooth roots. In addition to the likelihood of sealing infection into a tooth through the placing of a crown, the full crown errs because of its impingement upon the gingival margin. If an infection is already established here it is made worse. If the edge is previously clean, it is now likely to become infected. What I have said of full gold crowns holds, of course, also for all bands placed about the teeth. The danger of infection is one hundred per cent when such bands impinge upon the gum margin.

I have said enough to indicate how difficult is the problem which the modern orthodontist is asked to meet and how clear must be his judgment. He has to choose and develop ways and means which, while they accomplish his purpose of bringing into proper alignment badly placed teeth, do this without danger to their life, without aggravation of already existent infections and without the actual production of such in teeth previously healthy. I leave it to you to determine how far such an ideal is now being accomplished. I can tell you, however, from my own experience that the development of grave systemic disease in children and individuals in their teens has been coincident too often with the initiation of orthodontic practices and that their clearing up has followed time after time only after the removal of orthodontic appliances which apparently capable men of your own profession insisted satisfied every requirement of modern practice.

5. Dental surgery had a great period with us some thirty years ago. It was a time when medical men skilled in the principles of pathology and surgery took pride in doing the surgery of the head and neck. Out of the throes of general surgery was born the dental surgeon whose name made famous our United States. Let it be remembered that these specialists were not short-trained, self-anointed souls. Their pupils too largely learned the tricks of the masters without their principles. There followed the dental schools, strong in mechanics and weak in the scientific foundations underlying their use. It is not worse with the orthodontists than with dental surgeons in general and not worse with these than with the general surgeons of today. But I believe that the day has come for a turning back and a relearning of the principles which made our forefathers great. Surgery is due for a renascence and I sometimes think that it may come a little sooner for the orthodontists and dentists than it will for the surgeons in general.

DISCUSSION

Dr. Willam G. Skillen, Chicago.—It was with a great deal of hesitancy that I permitted myself to come here to discuss this paper because of the fact that I did not receive a copy of it to look over before the meeting. It always seems to me that it does not do justice to any of us to have a discussion on a paper without due and long consideration being given to it ahead of time. However, as I am here I shall endeavor to say a few words regarding it.

Every point the essayist has made is well taken, if we let alone the pulpless tooth situation and the effect of dental diseases on the general system, although I believe that those two things might be better overemphasized for the dentist rather than underemphasized.

The one point I should like to amplify is that in dentistry, and especially in orthodontic procedures, we are dealing with vital tissues. Why are they vital tissues? Because they are formed, developed, maintained and controlled by cells. What are cells? Cells are simply workmen; they are living animals, and if we keep that in mind we won't lose the character of the structures with which we deal.

The ameba is an animal, and it is a cell, and it floats and swims around in pond water. It is doing throughout the day practically the same things that you and I are doing or that every other animal is doing on the face of the earth, only differing in degree. Is it going to keep up the same pace, day in and day out, or is that going to vary, and why is it going to vary? It is going to vary because of the condition of its environment. Its ability to carry on its work will depend on the amount of nutrition it will receive, and therein lies the point that I want to amplify which the essayist has well brought out, that those cells which have the making of the tissues with which you are working and upon which you are going to depend to rebuild the whole structure with which you deal are like the ameba, living animals—workmen. They look for their vitality and ability to carry out that work upon the general condition of the body. This is work of a nature in which you are interested. It is far more important for you to recognize the systemic reactions upon those cells than any other branch of dentistry. It is only by careful study of the vast effects that may be brought about by these cells that you can obtain a good knowledge of the effects that you get even from slight changes in any one part of the chain.

In this line a very interesting picture presented itself recently, an illustration in which, because of a slight distortion of one tooth all of the tissues and the teeth for some distance on either side were involved. That is the extent to which these stimulations may go. I congratulate the essayist on bringing up the one vital question of the effects of systemic conditions upon those cells with which you are coming in contact and upon which you are calling to do work.

Dr. Theodore H. Bast, Madison, Wisconsin.—It has been a great pleasure this afternoon to me to listen to Dr. Martin Fischer. I have always heard a great deal about him through the authorities at the University of Chicago, and I was certainly pleased to hear what he had to say this afternoon.

Dr. Fischer is a physiologist, and I am an anatomist, and an anatomist naturally would emphasize the physical or structural side more than a physiologist. However, I agree with Dr. Fischer that the anatomist certainly does not emphasize the functional element sufficiently, I stated in my paper yesterday that we must consider function in connection with structure. I believe that a tooth is a living structure as bone is. I think, however, it is quite essential sometimes that we should consider tooth structures in order to fully understand function. It may be all right to simply consider a tooth as a tooth or a piece of bone and the surrounding tissue as a mere socket. That may be all right from a certain functional standpoint. But there are certain structures—take, for instance, bone cells and their relation to the surrounding structure—which, if we know the details of their make up give us a much better idea of their function. Every part of an automobile is essential to make that automobile go—every structural part, and so I believe God almighty put every single part in a bone for a definite purpose. Now we may be able to arrive at the functional significance of a structure as a whole

and get a correct idea regarding it, but it oftentimes helps us to understand it better if we understand the details regarding it.

I was interested in the statement Dr. Fischer made that a tooth is a living structure, and that heat may destroy the surroundng tissue by cooking it. I too believe that. I have noticed that in suppurative processes, bone cells lying on the suppurative border are usually destroyed. And so any disinfectant which is too strong which you may apply, or even electrical stimuli, if too strong, will destroy the tissues immediately surrounding the part to which it is applied. These agents will destroy the cells, and if the cells are actually functioning, as they appear to be, and if they gradually control the tissue immediately surrounding them, then destruction of the cells, will also result in the devitalization of the matrix in which they lie.

I had occasion to talk with two gentlemen this morning who are connected with the University of Chicago, and both of them have come to believe that the function of these bone cells is a very important thing. Heretofore bones have been regarded as dead structures, but now we come to believe that these small bodies lying in the bone are the vital elements that control the surrounding structure. You cannot have function unless you have structure, and if you have structure, there must be a function. Therefore, if we have a full understanding of the function of an organ it is essential that we first know all the anatomical details of it.

Dr. Leuman F. Waugh, New York City.—It takes some courage to discuss a paper which has been so beautifully presented to us by a member of the medical profession and a teacher of prominence. However, there are two or three things which were said in that paper which I do not think as members of the dental profession we should let go into the literature without at least having an expression of the general feeling that exists among the students and investigators in our own profession.

I have enjoyed the many points Dr. Fischer brought out very much. I might say that my father was a dentist, and sometimes I feel as though I was conceived and born in dentistry. After fourteen years as a general practitioner of dentistry I was not sure whether I was anointed or the Lord called me to be a specialist. At any rate, I have practiced the specialty of orthodontia with all the sincerity and with all the ability that lies in me. I have recognized that in orthodontia we base our practice upon the general biologic sciences, and that if we would practice orthodontia as it should be, we will not be satisfied with studying the forces which move the teeth; we must delve into the structures in which effects are brought about. One must reason in terms of physiology and pathology and study the histology of the normal minute structure, and these together with physiology are the basis upon which all pathologic changes must be recognized. The essayist is quite right in what he said about "tooth saving" and the saving of living structure.

He has asked us to accept a tooth as a bone in a general sense. That might be all right if we were not delving deeply into a minute consideration of conditions. But it is not fair to compare teeth with bone. Bone is a connective tissue, of mesodermic origin, and a tooth is only a part of the mesoderm. It is partly of ectodermic origin, and the whole tooth is an appendage of the skin.

The essayist speaks of the dental pulp as being the only nutritive factor we have present in the human tooth, whereas, as a matter of fact, after the tooth has become fully erupted the nutritive quality of the dental pulp becomes progressively diminished as age advances.

The dental pulp has two functions, one of which is formative, and the other nutritive, promoting the function of building of the dental follicle. It begins at the stumps, what will be the crown of the tooth and lays down, according to the action of the odontoblasts, calcific matter. The dentin builds from without inward. The more the dental pulp builds dentin, the smaller it becomes. It builds a calcified area or crypt in which it exists. As a tooth erupts its roots are not fully developed. Development or completion of the apex of the permanent tooth, when it is underlength, takes place in two to four years after the crown of the tooth has come through the gum the canines being more complete in

apical formation than any of the teeth. When the tooth pulp is complete, evidence occurs in which there is a period of physiologic rest, and it remains there until there is some outside irritant or stimulus to build more dentin. The dentin formed by the dental pulp is builded after the tooth has had a period of physiologic rest, the result of stimulus, of irritation, as secondary dentin. We may refer to the dental pulp as being perfectly insulated or protected beneath the unbroken enamel and normal dentin. If for any reason the enamel becomes thin, a reactionary effect is produced within the tooth structure for the purpose of restoring the original degree of insulation which existed in the tooth before the enamel was disturbed. It is the first effort on the part of Nature to restore the insulation of the dental pulp by tubular calcification, the process by which the tubules of dentin are gradually made smaller, due to the deposition of calcific material to its walls until the tubules become solidified, and the protoplasmic processes which extend into the tubules which convey nourishment to the dentin are impinged upon and crowded out. If the tubular calcification is insufficient to restore the original degree of insulation, the dental pulp is stimulated to form secondary dentin, and this it does up to the point of restoring the original protection which it possessed, and then it stops forming dentin. The osteoblasts may die as a result of overstimulation by which the deeper lying cells of the dental pulp take up the formative process. As the dental pulp builds more dentin it becomes smaller. As we grow older all the tissues of our body change and they become more fibrous. In the dental pulp the same changes occur, and it is at the time of completion of the root the dental pulp receives more and more nourishment as compared with the tissues of the body. When the dental pulp is irritated we find there is a gradual diminishing nourishment of the dental pulp. In this connection I want to pay my tribute to that great scientist, Dr. G. V. Black, who taught us twenty-five years ago the things I have been speaking about, and the dental profession has not grasped them yet. As we grow older the pulps in the teeth are converted immediately into the function of forming dentin, and again take on the secondary function of nourishing dentin, and the nourishment diminishes as we grow older. When the pulp in a tooth is removed it is absolutely not a dead tooth at any time in the history of that tooth. If the apices have been completed the nourishment within a tooth is not to be compared in quantity or quality with the nourishment given to that tooth from the copious blood supply that is ever present in the peridental membrane. A tooth without a pulp is not a dead tooth, and I wish the medical profession would please remember that.

Theory in science is valuable, but theories are only valuable as they may be applied in practice. Anything that does not work out in practice as it was worked out in the laboratory or in textbooks is not safe for practice and must be disregarded as a guide for practice. I do not say that every tooth with a dead pulp can be saved, but I do say it is a most unsafe principle for anybody to teach that a tooth because its pulp has been removed and its canal filled cannot be maintained in the human body in health and in efficiency. Clinical evidence bears out the fact that teeth filled in the older days by innumerable operators, even before such aseptic measures as the use of the rubber band were possible, before even surgeons recognized the value of asepsis in surgical operations, have lasted in the human mouth thirty, thirty-five, and forty years or more, without any evidence locally of disturbance, and what is more important, without any evidence in the entire system of disturbance.

It has another bearing on orthodontia. We may deceive ourselves often, although we observe carefully, relative to the strangulation and death of dental pulps. Fortunately we see most of our cases when the patients are young. We do most of our work before the apices of teeth are closed. If we give the slightest attention to radiograms or to sections in our laboratory studies of the development of teeth, we find most of our teeth are moved best when the apices are wide open, when there is a copious blood supply, when it will be difficult for us to strangulate the pulp ends, which is quite different from the picture presented to us of closing apices with tiny canals into which nerves and blood vessels enter.

I have radiograms of cases taken early in my experience in orthodontia, and I do not know from clinical evidence or radiographic findings of a single pulp with my methods of

moving teeth, which are the same as yours, that caused death or injury of a dental pulp in a period of ten years.

Dr. Fischer (closing).—I sincerely hope that some of the other statements of my talk come nearer the truth than my remark that reasonable men always agree.

There is an experiment which I cite to my students to illustrate the difference between a living structure and a dead one, and its liability to infection. A freshly granulating surface such as may be seen in a healing burn of the skin may have a culture of staphylococci or streptococci poured over it with little hope of infection; but let this be followed by the slightest injury to the growing cells,—a bit of gauze dragged over them will do—and the whole surface will be bathed in pus in a few hours. If you want to know one of the reasons why the older surgeons got the brilliant results so frequently missed in our modern day, it was that they worked with defter hand. The older man got good results even without aseptic technic, because he did little injury to his patient. Bacteriologists will tell you that our modern "aseptic" surgical technic is still not a technic free from bacterial infection. Couple this fact with a reduced mechanical skill and many of the bad results in modern surgery will be explained to you. I heard a surgeon say twenty years ago that he would rather have a man who cleaned his hands with soap and water and had a light touch enter his abdomen than one who devoted forty minutes to scrubbing and antiseptic baths. The latter with his roughened skin has, in fact, also a dirtier one, bacteriologically. Let him injure more than necessary his surgical subject and a bad result is inevitable. If you do not believe what I say, follow the day's work of several extractionists. Their offices carry a fairly even type of initial mouth infections. But the results of the surgery practiced are vastly different. Why should it be that the patients of those who have weak arms, use nitrous oxid anesthesia, little local pressure, little adrenalin and small amounts of local anesthetic should get the least local reaction, the quickest healing and the most comfortable jaws while those whose arms are heavy and whose hands are "Westphalia hams" get so definitely opposite results?

Adrenalin and all local anesthetics make for lack of oxygen in the affected cells and thus an ideal culture medium for the bacteria stirred to life through an extraction. Scrupulous care in their use and a minimal amount of traumatism—these are the things that save the surgical day.

I know that the histologists can demonstrate certain differences between bone and tooth structure, but I again insist that such structures do not make for functional differences, but vice versa. The structure given a tissue or organ through birth is the expression of the uses to which that tissue has been put by preceding generations. We can keep the heritage and develop it only by similar and further use. The involuntary muscle of the higher animals develops cross striations if worked hard enough; and cross striated muscle becomes smooth in type through nonuse.

I regret that I did not bring out the fact that the dental pulp is not the only source of nutrition to the tooth. There is the peridental supply but this is quantitatively insignificant as compared with the former. It needs also to be remembered that no adequate anastomoses exist between the two to permit of a collateral circulation to the supplied tooth structures if either is destroyed. The peridental supply will not, for instance, maintain the life of the inner portions of the dentine after the central artery to a root has been fished out or twisted off as is so commonly taught. It is true, too, that irritation of tooth structure is followed by new bone deposition. No one denies these things. But such regeneration will not occur in a tooth without blood supply or in dead tissues. What is frequently regarded as regenerating tooth structure in a killed tissue is nothing but the ingrowth of connective tissue into a necrotic mass which Nature is doing her best to absorb.

I have discussed the question of the maintenance of devitalized teeth many times before. The answer is perfectly clear. If a noneroded tooth, for example, has had its blood supply twisted off it is a three-quarters dead affair. If not infected from without or through the blood stream it constitutes a sterile sequestrum and like every clean foreign body can be tolerated. Dentists and patients who wish to carry their own life insurance

may preserve such structures. Too often, however, the tooth is eroded or a marginal infection is present or an infection in some fashion or other becomes superimposed. We then have the tooth a part of that general junk pile of devitalized teeth, of which more than 97 per cent are infected according to the x-ray studies of your own colleagues. If a patient harboring such structures has constitutional disease also they had best be given consideration. Denial of the existence of infection by a dentist does not mean that none is present.

I make a similar answer to the question of strangulated pulps. As I have already indicated, the danger of strangulation is less in young children and when slow, moderate and monodirectional movements are carried out than when larger movements or twists are made in older individuals. Such strangulation can and does occur in perfectly normal, noninfected, noncarious and nonfilled teeth. It is idle to deny this or the nature of the changes which follow strangulation.

REPORT OF COMMITTEE ON DENTAL NOMENCLATURE*

(Presented to House of Delegates, National Dental Association, Los Angeles, California, July, 17-21, 1922)

By L. P. Anthony, D.D.S., Philadelphia, Pennsylvania, Chairman

YOUR committee begs to report as follows: The purpose of the nomenclature of dentistry as of any profession is to provide the means for the intelligible interchange of ideas to the end that its development and growth may progress and keep pace with that of the other professions.

Through its literature each profession becomes acquainted with the state of development of its sister professions and thereby is judged as to its intellectual stature and the verity of its accomplishments. The scientific status, the exactness of knowledge, the cultural developments and the mental habits of a profession are distinctly reflected in its literature, and the retarding influence of insufficient and defective vehicles of expression must be removed if it is to keep pace with the other learned professions.

We are all conscious of the fact that the development of dentistry for the past two decades has been moving forward with such rapid strides that our present terminology no longer meets the demands of the science and imposes a serious handicap upon our progress that we can ill afford to longer ignore.

The expansion of the field of dental activities resulting from the general recognition of the interrelationships of oral infections and bodily disease has necessitated an equivalent increase in our descriptive nomenclature. In response to this need for a larger terminology we have unfortunately been flooded with a group of terms that are manifestly amateurish in conception and defective in their etymology, hence they fail to correctly function as descriptive designations.

It is quite apparent that the busy practitioner is indifferent to this important phase of our literature, seemingly being content with and almost demanding that the subject be dealt with by those intimately concerned with the historical record of dentistry in the literature—namely, teachers, writers, editors, etc., they being in a better position to undertake the task involved in the harmonizing of our present terminology and enlarging it to meet our requirements.

Since the notable efforts of Black, Guilford, Molyneaux, Wilson and others at the time of the World's Columbian Dental Congress, and later those of the American Institute of Dental Teachers, little has been done to increase and enlarge our nomenclature, with the exception of some individual efforts. Individual efforts, while they may be praiseworthy and often productive

*This report will be published in the *Transactions of the American Dental Association*, held in Los Angeles, California, 1922. These may be purchased at $1.00 each through the office of the American Dental Association, 5 N. Wabash Avenue, Chicago, Illinois.

of much good, inevitably lead to confusion in the use of several words to mean the same thing, and mainly serve to impress more forcibly the necessity for coordination of efforts to the desired end.

Any effort, however, to standardize our nomenclature should be made with a definite purpose of conforming it as closely as possible to the general laws of nomenclature as already accepted by the biological sciences. The desirability of this course needs only to be mentioned here; so also is it only necessary to suggest the resulting enormous saving of duplication of work in the elemental phase of the undertaking that would accrue from this course.

There is a two-fold responsibility involved in the adoption of a scientific dental terminology. Terms must not only express their meaning with precision, but as in medicine many terms are used to express a relation to a pathological or other biological phenomenon. These terms must not only be correct in an etymological sense; they must be so coined as to have a correct scientific meaning, and those who originate them must not only possess the cultural fundamentals necessary to constructive work in the science of nomenclature, but must also have a broad scientific vision, as well as an intimate knowledge of the subject in all its aspects.

Realizing the desirability of coordinating the various efforts being made to bring about uniformity of dental terms and conscious of the necessity for a distinct forward step in the field of dental nomenclature, the Dental Editors Club, an organization composed of the editors of dental magazines of the United States and Canada, at its meeting in Milwaukee passed the following resolution:

WHEREAS, the Dental Editors Club of North America at its meeting in Milwaukee, August 17, 1921, realizes the pressing need for standardization of dental terms, be it

Resolved, That the Dental Editors Club of North America petition the House of Delegates of the National Dental Association to appoint a standing committee on nomenclature, to whom matters relating thereto emanating from various committees on nomenclature of other organizations be referred for consideration to the end that the standardization and harmonizing of our technical dental terms may be under the direction and control of our national organization.

Pursuant to the intents and purposes of the above resolution, the National Dental Association appointed the following committee on Dental Nomenclature: Drs. C. N. Johnson, Otto U. King, H. E. Friesell, H. L. Wheeler and L. P. Anthony, as chairman.

Soon after the adjournment of the Milwaukee meeting, the chairman of the committee took steps to get in close touch with those who have shown interest in this phase of dentistry, with the result that many suggestions from individual members of the profession were offered as to the adoption of new words and many criticisms made upon words now in use. We also have had the cooperation of several subordinate organizations of the National who have suggested words relating particularly to the specialties with which they are concerned.

The committee, while feeling the necessity of prompt action in regard to some of the words and suggestions offered, does not feel that it can present a final and definite report on all the terms that have been considered at this time.

It is not an easy task to decide upon the adoption of a certain class of words in dental nomenclature, as the conditions are continually changing and it is practically impossible in some instances to foresee all the difficulties that may subsequently arise in the use of a word.

As an example one word will suffice. All are familiar with the long drawn out discussion of the use of the words "model" and "cast." After so many years the profession has about accepted the word "cast" as preferable to "model," as the word "model" is incorrect in the sense in which it has been so long used in dental literature. Now that "cast" has been accepted, the development of the method of inlay casting has much confused the use of the word "cast" so that now it is quite difficult in some instances to apply the word generally.

There is also much unforseen difficulty in other phases of dental literature, namely, conforming our nomenclature to that of the other biologic sciences. We cannot afford to disregard the nomenclature of other sciences in forming our own, and, while there are instances in which we have by determined effort succeeded in establishing the use of some words which have conflicted with their use in other sciences, we do not feel that it is worth the effort and the resulting confusion consequent thereto. As examples of the latter, we might cite such words as "articulate," "cuspid," "bicuspid," "mandible," etc. In the case of the last mentioned word it has caused much confusion in anatomical nomenclature for the reason that the nomenclature of the teeth, jaws and surrounding parts has been built around the word "maxillary" applied to both jaws, and the adaptation of mandible has been difficult and thus far not accomplished completely in relation to the anatomical terms given to the parts contiguous to the mandible.

All of this may, however, be avoided if we keep to the suggestion in the forepart of this report, i. e., that our nomenclature be designed to conform to that of the other biologic sciences.

The objection is often raised to so-called hybrid words, i. e., words which have both Greek and Latin derivative root words. This occurs to the committee as being more or less pedantic. The vast majority of the words of our language are of Greek and Latin origin, and such being the case there is no valid reason to the committee why, if the two languages are chosen and preferred as derivative languages, we should not avail ourselves of the advantages to be gained by a combination of the two in forming our words.

Generalities with regard to nomenclature, its purposes and the best methods of deciding upon terms are all well and good as suggesting principles upon which to work, but we realize that what is most desired particularly is some concrete result reached by the committee. We have therefore and with careful deliberation prepared a list of words which we recommend to the Association for adoption and use in the sense in which we suggest they should be used. We also present some words suggested which do not seem

to conform to the intents and purposes of dental nomenclature, and which we recommend be abandoned as promptly as possible.

LIST OF WORDS RECOMMENDED

alveolectomy (L. alveolus + Gr. ektome excision). Excision of a portion of the alveolar process.

alveolotomy (L. alveolus, [process] + Gr. tome, cut). Incision into the alveolous of a tooth, as for locating the end of a root of a tooth.

anesthesia. Preferable to anaesthesia.

apicoectomy (L. apex, gen. apices, the end [of a tooth root] + Gr. ektome, excision). The operation of excising the end of the root of a tooth. To be used in preference to apectomy; apiectomy; apicectomy.

artificial denture. Preferable to plate.

cuspid. In preference to canine.

cementum. To be used in preference to cement.

conduction (adj.). To be used in preference to conductive, as in conduction anesthesia.

deciduous (adj.). To be used as designating the teeth of the first dentition, in preference to the terms "temporary," "milk" or "baby."

dentural (adj.) (L. dens, dentis, tooth). Relating to the denture.

first molar. To be used in preference to "six-year molar," "sixth-year molar."

mandible (L. mandibula from mandere, to chew). The lower jaw.

maxilla, pl. maxillae (L. maxilla, jaw). The upper jaw.

morsal and occlusal (adj.). To be used synonymously as relating to the masticating surfaces of the bicuspid and molar teeth.

centric occlusion. To be used to express the relation of the inclined planes of the teeth when the jaws are closed in the position of rest.

eccentric occlusion. To be used to express the relation of the inclined planes of the teeth in the excursive movements of the mandible.

mesial and distal. These terms as used today have been objected to as not being in conformity with anatomical nomenclature, where they are used to indicate relation to the median line of the body. They have, however, become so fixed in dental nomenclature that we do not suggest any change.

pathodontia (Gr. pathos, disease + odous, tooth). That branch of dentistry which has for its purpose the study and treatment of diseases of the teeth.

pathology (Gr. pathos, disease + logos, treatise). That branch of medical science which treats of morbid conditions, their causes, symptoms, etc. This term is being loosely used to indicate a disease or pathologic condition, which is confusing, unnecessary and undesirable.

pediadontia (Gr. pais, paidos, child + odous, tooth). That branch of dentistry which has for its purpose the study and treatment of children's teeth and mouth conditions.

periodontia (Gr. peri, around, + odous, tooth). That branch of dentistry which has for its purpose the study and treatment of diseases occurring around the teeth and their roots.

periodontal (Gr. peri, around. + odous, tooth). Relating to the alveolo-dental ligament. To be used in preference to peridental.

periodontoclasia (Gr. peri, around + odous, tooth, + klassis, breaking [down]). The destructive degeneration of the tissues about the root of a tooth. Substituted for pyorrhea alveolaris; Riggs' disease; interstitial gingivitis.

periclasia (Gr. peri, around, + klassis, breaking [down]). Used as a shortening for convenience of periodontoclasia. Should be used with a qualifying word, as in itself it does not mean anything in particular.

pontic (L. pons, pontis, a bridge). (Adj. and noun.) A substitute for a natural tooth. Used in preference to dummy.

bicuspid. In preference to premolar.

prosthesis (n.) (Gr. pros, to, + tithemi, to place). Preferable to prothesis. (Because of the more definite application of the Greek preposition pros, as compared to pro in this form.)

prosthetics (n.). Preferable to prothetics. (For same reason as in prosthesis.)

pulpless tooth. To be used in preference to "dead tooth," "devital tooth," "devitalized tooth." In cases where there is a "vital" pulp in a tooth or a "non-vital" pulp, it should be so designated; e.g., a tooth with a vital pulp, or a tooth with a non-vital pulp.

radiology (n.) (L. radius, ray + Gr. logos, treatise). The science of radiant energy. To be used as the generic term to indicate radiant energy from whatever source.

radiogram (n.) (L. radius, ray, + Gr. gramma, a writing). The product or tangible result, as the film or the print thereof, of the radiographic process, actuated by radiant energy of whatever source.

radiograph (verb) (L. radius, ray, + graphein, to write). The act or process of making a radiogram.

radiography. The art of making radiograms.

radiopaque (L. radius, ray, + opacus, shady). Term applied to a substance that is impermeable to the various forms of radiant energy.

radiolucent (L. radius, ray + lucere, to shine). Term applied to substances that allow the passage of radiant energy light, but offer some resistance.

radioparent (L. radius, ray + parere, to appear). Term applied to substances that freely transmit the light of radiant energy.

roentgen ray. To be used in preference to x-ray, and only where the specific ray is indicated.

roentgenology. The study and use of the Roentgen ray in its application to medicine and dentistry.

roentgenography. The art of making roentgenograms.

roentgenogram. The shadow picture produced by the Roentgen ray on a sensitized film, or the print from the film.

roentgenograph (v.) The act of making a roentgenogram.

second molar. To be used in preference to "twelve-year molar," or "twelfth-year molar."

third molar. To be used in preference to "wisdom tooth."

Vincent's infection. To be used to express the ulceromembranous stomatitis caused by Vincent's spirillum and fusiform Bacillus; in preference to Vincent's angina; the latter being more applicable to the throat infection.

x-ray (n.) This word is used indiscriminately as a noun and verb. It should not be used as a verb. The word Roentgen ray is preferable. It should also be used with small x rather than with the capital X, if used at all.

penetology. odontalysis. These two words have been suggested, the first to mean the science of radiant energy, and the latter, examination of the teeth. We see no justification for either etymologically or otherwise.

The committee is pleased to state that in the near future there will be available places of accessible record of the activities in the field of dental nomenclature that have not been open to the profession since the passing of Harris' Dental Dictionary. If the present plans mature as proposed there will soon be issued no less than three dictionaries devoted to dentistry, namely, one compiled by Dr. W. B. Dunning, under the auspices of the American Institute of Dental Teachers; one compiled under the direction of Dr. Louis Ottofy, of Chicago, and a third compiled by the chairman of this committee. The committee and the profession can thus feel assured of a permanent continuing record of its activities in the future.

In concluding the report your committee earnestly solicits the cooperation of committees on nomenclature and of individuals who are actively interested in this subject, to the end that our nomenclature may be as expeditiously as possible enlarged to meet the needs of the profession.*

Respectfully submitted,

L. Pierce Anthony, *Chairman*,
C. N. Johnson,
Otto U. King,
H. E. Friesell,
H. L. Wheeler,
Committee.

*The House of Delegates by unanimous vote received, adopted and authorized the publication of this report.

DEPARTMENT OF
ORAL SURGERY AND SURGICAL ORTHODONTIA

Under Editorial Supervision of

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HARE LIP AND CLEFT PALATE*

By Dr. M. N. Federspiel, Milwaukee, Wisc.

IN THE human mouth at the entrance are two fleshy folds, the lips, covered externally by the skin, and internally by the mucous membrane.

In the middle part of the outer surface of the upper lip is a vertical depression, groove-like in appearance, called the philtrum. The inside of the upper and lower lip in the middle line joins the gum tissue of the corresponding jaw by a fold of mucous membrane called the frenum. The covering of the margin of the lips is mucous membrane, which is thicker and drier than that of the oral cavity called the vermilion border, which is well defined.

In the middle line of the border of the upper lip and at the lower end of the philtrum is a slight elevation, the labial tubercle. On each side of the labial tubercle the vermilion line points upward, and then gently curves downward to the angle of the mouth. In the lower lip the vermilion border is greater in the middle line from which it curves gently downward to the angle of the mouth.

In a healthy person, the vermilion border of the lips is of a bright red color and lightly wrinkled. The thickness varies in individuals. This is also true of the amount of redness exposed.

The formation of the upper lip is brought about by the union of the maxillary globular and frontonasal processes in embryo. Should these processes fail to unite the result is a defect called *hare lip.*

The nomenclature used in the description of this deformity does not resemble the cleft of the hare's lip, which is located in the median line bifurcating to each nostril (see illustration Fig. 1) but may affect any part of the lip.

The cleft in the lip of the human being may exist as a mere notch in the

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vermilion border (see illustration, Fig. 2), or it may continue into the floor of the nose (see illustration, Fig. 3).

Hare lip may be divided into (a) single or unilateral hare lip (complete, incomplete); (b) double or bilateral hare lip (complete, Fig. 4, incomplete).

The above classification applies to the usual cases that come to the oral surgeon for correction.

Frequently one finds cases of incomplete hare lip where the tissues above the fissure are not of normal thickness. The covering is nothing more than the skin. It is smooth, does not contain hair follicles and sweat glands. The color is more red and appears to be somewhat like mucous membrane. It may appear like an old scar (see Fig. 5).

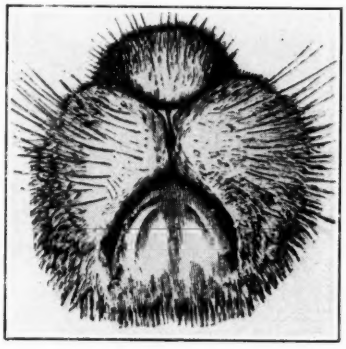


Fig. 1.—Hare's lip.

Fig. 2. Fig. 3. Fig. 4.

Fig. 2.—Showing a notch in the vermilion border.
Fig. 3.—Showing a cleft of the lip extending into the floor of the nose.
Fig. 4.—Bilateral hare lip.

In some cases the streak of abnormal skin extends to the floor of the nose, and the nostril is usually wider than the opposite one. These patients when operated on should have all of this abnormal thin covering removed, and cared for like a complete hare lip in order to obtain a good result.

The shape of the nose in complete hair lip is very characteristic. The nostril is broad and flattened out.

The cleft of the lip is more common on the left side than on the right. Rose reports that Muller found 142 left sided against 62 right sided clefts.

Mason, out of 65 cases found 54 to be unilateral, and of these 35 left sided to 19 on the right.

Kolliker mentions that of 165 unilateral clefts, 113 were on the left side, and 62 on the right.

In my own observation of 80 cases I find that 70 per cent had a cleft on the left side.

Double hare lip is a condition where the fissure may be complete or

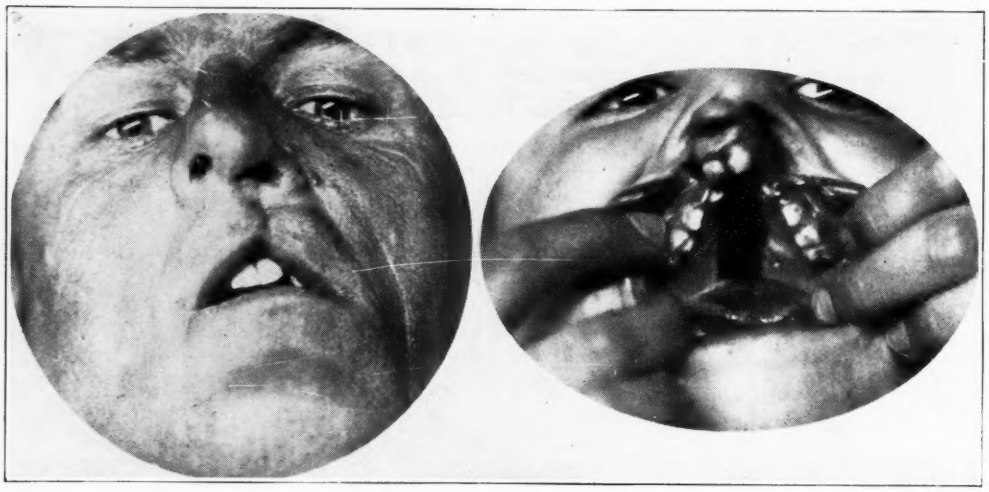


Fig. 5. Fig. 6.

Fig. 5.—Showing an incomplete hare lip. The covering is skin without hair follicles and sweat glands.

Fig. 6.—A double cleft of the alveolar process which unites at about the position of the anterior palatine canal and then extends backward.

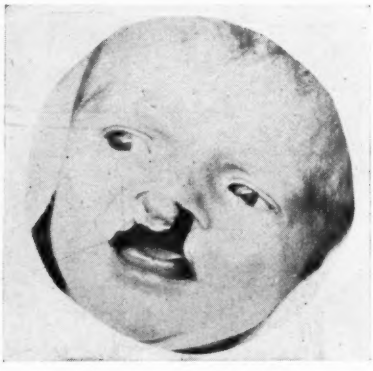


Fig. 7.—Showing a protrusion of the premaxillary bone.

incomplete on both sides, or it may be complete on one side and incomplete on the other.

When the fissure is complete on each side the nostrils are flattened outward. The vermilion border on each side of the fissure extends into the nostril. The central part of the lip frequently extends forward on account of the protrusion of the os incisivum which it covers. (See illustration, Fig. 6.)

When this occurs the alveolar process has a double cleft which unites at about the position of the anterior palatine canal, and then may extend

backwards as a single cleft of the hard and soft palate (see illustration, Fig. 7).

In a large number of cases where there is a single hare lip and a single cleft of the alveolar process the premaxillary bone is turned outward and protrudes, causing the nose to be shifted to one side. In such cases the vomer is usually deflected.

When to Operate. As a general rule, the repair of a hare lip should be done as soon after birth as is possible. I usually operate on these cases three to four weeks after birth. While the earlier operation is considered imperative, the surgeon must take into consideration the degree of deformity, and the amount of vitality the patient has. Frequently patients possess a low vitality, due to inherited weakness, or to inability to receive nourishment properly owing to the cleft of the lip and palate. I do not believe that a set of rules can be laid down as to when to operate, as it is up to the surgeon to carefully weigh and consider the patient's vitality and resistance to withstand the shock of the operation, or any complication that may arise.

Treatment—Preoperative Care. When a child is born with a hare lip

Fig. 8.—The borders of the cleft are held together with adhesive tape as a preoperative care.

the mother should not be allowed to see the infant until the borders of the lip are brought together as close as is possible, and held so by a strip of adhesive tape. (See illustration, Fig. 8.)

It is well to inform the parents that the deformity can be corrected by an operation, and that results are usually very good.

It is of great importance that practitioners who are present at the birth of a child with a hare lip should see to it that the borders of the cleft are held together, or nearly so, with adhesive tape.

The chief reason for this preoperative care is that the pressure brought about by the adhesive tape will greatly assist in molding the lip so that the fissure becomes more narrow. In patients who have a cleft of the lip and alveolar process such treatment often aids in reducing not only the width of the lip cleft, but also narrows the cleft of the alveolar process.

I have seen a number of cases where such preoperative care within three weeks caused a wide extensive cleft of the lip and alveolar process to be considerably narrower.

When one observes a child with a hare lip crying or laughing the sphincter-like action of the orbicularis oris muscle cannot functionate normally, so that when contraction occurs each half of the lip pulls away from

the center, and therefore exaggerates the deformity. If, however, the borders of the lip are held together with adhesive tape the child in the act of crying or laughing will fail to widen and evert the edges of the cleft. The tendency then will, by muscular pull, cause the cleft of the lip and alveolar process to become more narrow during the growth of the child.

The narrowing of a cleft during the preoperative care is of great importance to the surgeon in obtaining a better and more cosmetic result.

Fig. 9.—Nelaton operation.

Fig. 10.—Graefe operation.

Fig. 11.—Koenig operation.

Fig. 12.—Haagedorn operation.

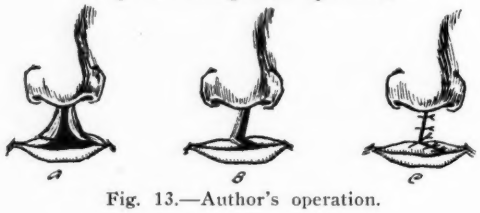


Fig. 13.—Author's operation.

In cases that have a complete cleft of the lip and alveolar process, and palate, some surgeons recommend the closing of the alveolar cleft first and then at a later time the cleft of the lip, especially so if the Brophy operation is to be performed, as the surgeon has better access to the palate. However, I have abandoned, in most cases, this method for the reason that after the cleft of the lip is closed the sphincter-like action of the orbicularis muscle will usually mold the alveolar cleft so that its borders approximate, and in some cases closure takes place.

In such cases after the cleft of the lip and alveolar process are united

I close the palatal cleft several months later. At no time have I found any difficulty, in closing the hard and soft palate, to arise from a previous operation on the lip.

Anesthesia. In my experience I find that ether is the choice anesthesia for operations on hare lip and cleft palate.

The Sorenson ether vapor and asperating apparatus we find suitable for this purpose. It permits free access to the operating field without interfering with the operations of the anesthetists.

The ether vapor is pumped into the mouth through a tube. The nostrils are gently packed with gauze to prevent blood running through the nostrils into the pharynx and larynx.

With regard to the position of the patient I prefer the recumbent posture on a table, the anesthetist at the head of the table, the assistant and operator on each side. After the parts to be operated on and surrounding area have been thoroughly cleansed, then bathed with 60 per cent alcohol, the patient is ready for operation.

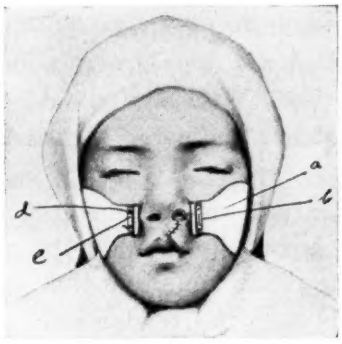


Fig. 14.—Author's method of relieving lateral tension. *a*, Adhesive tape; *b*, wire ligature; *c*, German silver plate; *d*, perforated shot.

Operation for Single Hare Lip. This operation for convenience of description may be divided into four stages:

1. Freeing of the lip from its attachment to the maxilla.
2. Cutting of the borders of the cleft to obtain symmetry of the nostrils—an invisible scar of the lip—and well contoured vermilion border.
3. Insertion of sutures in the skin and mucous membrane.
4. Prevention of lateral tension.

Freeing of the Lip from Its Attachment to the Maxilla. In order to obtain a well formed lip it is of great importance to thoroughly free the lip from its attachment to the maxilla, especially the ala nasi should be dissected freely from its bony attachment so that the flattened and distorted nostril may be made to correspond in shape and size to that on the opposite side.

After making an incision down to the bone the soft tissue can be stripped from this bony attachment with a blunt dissector—this method will minimize bleeding.

If, however, hemorrhage is severe, hot sponge pressure will readily control the flow of blood.

The extent to which the lip should be detached from the bone depends upon the width of the cleft; unless this is done to the extent that the parts to be united can be approximated in their new position without tension, one cannot hope for an artistic mouth.

Hare lips which have been operated upon without doing a free under cutting will usually show a flattened nostril and a triangular scar extending downwards from it.

Cutting of the Borders of the Cleft to Obtain Symmetry of the Nostrils—An Invisible Scar of the Lip and a Well Contoured Vermilion Border. This stage of the operation must be done with great care in order to obtain symmetry of the nostril, to avoid a scar and a continuous and well formed muco-cutaneous line or red margin. The cutting away the borders of the lip to obtain union of the two segments of the divided lip is not sufficient. While such procedure will close the cleft it will not avoid the formation of a V-shaped notch at the vermilion border, by subsequent cicatrization.

Quite a number of surgeons endeavor to utilize all of the tissue bounding the cleft of lip. This method is suitable in cases when the cleft is not extensive and the margins are quite parallel. The preparation of the borders of the lip depends largely on the degree of the deformity. No one method can be universally followed. The surgeon should rely on his own judgment and plan the incisions that are indicated for each case in order to obtain the best result.

From my own experience I am satisfied that a free removal of tissue on each side of the cleft is not justified, neither do I advocate the other extreme to utilize all of the tissue bounding the cleft of the lip.

The following methods give the reader some idea of the various forms of operation:

When a cleft of the lip is of moderate extent and does not involve all of the lip extending into the nostril, the Nelaton method may be followed.

This operation is done by making an incision through the lip above the angle parallel with the defect. The vermilion border will then drop downward. (See illustration, Fig. 9.)

The lower border of the wound is drawn downward and the sides of the wound sutured. This will cause the vermilion border to protrude downward. It is claimed that during the healing the shrinkage will be sufficient to form a normal shaped lip.

In my experience I find that this does not always happen, so I have abandoned this method.

The Graefe method will give the lip a better shape. This operation is performed by making a semi-circular incision above the defect as illustrated in Fig. 10.

The first suture is to be placed at the margin of the vermilion border and the skin, so that the sides approximate normally.

This method is quite satisfactory in cases where the notch in the lip is not extensive. If carefully done, one can obtain a splendid contour of the vermilion border.

When the cleft in the lip is more extensive, quite a number of surgeons follow the Konig method. This operation is done by making two vertical incisions in order to cut away the borders of the cleft.

After this is done a slanting incision is made on each side. (See illustration, Fig. 11a.) Then by drawing the wound together (Fig. 11b) and by holding the vermilion borders together and downward and then suturing, a very nice prolabium can be obtained (Fig. 11c).

The Haagedorn method is somewhat similar to the Konig method. The vertical incisions are semi-circular as shown in Fig. 12a, and the later incision slanting somewhat downward (Fig. 12b) shows the wound as it should be (Fig. 12c); the wound sutured. This operation will give a good appearing lip; however, in some cases, especially in those cases that have scar tissue following infection, it will form a V-shape notch in the vermilion border.

While there are so many methods advocated for the repair of a hare lip, I find that no one rule can be followed. In the majority of cases that I have operated I find the following method giving the best result: This operation is done by making a slight curved incision downward from the nostril, separating the vermilion border from the skin; then making a downward slanting incision on one side toward the cleft. On the other side a downward slanting incision away from the cleft (see illustration, Fig. 13a).

Fig. 13b shows the cut surface. Fig. 13c the wound sutured.

The planning of these incisions so as to provide a fullness of the vermilion border depends on the thickness of the lip, and the size of the cleft.

It is important that the suture be so placed that the raw surfaces will be in contact without any curling or buckling of the edges, neither should there be any bleeding of the raw surfaces. In our experience we find that fine paraffin silk is the ideal suture material. It does not absorb moisture, and is friendly to the tissue.

After the suturing the next step is overcoming lateral tension. This is important. Unless the wound is put at rest, one cannot hope for a good result. One should not rely on the skin and mucous membrane sutures to hold the raw surfaces together. Various methods may be used to reinforce these sutures. In our experience we have adopted the following methods.

Adhesive tape is glued to the cheek on each side. The edges near the lip are turned inward. A strong paraffin silk ligature is then passed through the tape into the lip midway between the skin and mucous membrane* in the form of a mattress suture, then by tying the loose ends, sufficient tension can be brought to bear so that the approximating sutures will not tear out from the sphincter-like action of the orbicularis muscle. (Fig. 14.) This simple method puts the lip at rest. The lip is again washed with 60 per cent alcohol made dry and liquid paraffin sprayed on the lip, so that the

*Silver wire is also used as illustrated in Fig. 14.

sutures are covered with a thin layer of paraffin. In the treatment of single and double alveolar clefts some surgeons recommend the closing of the alveolar cleft first and then at a later time the cleft of the lip, especially so if the Brophy operation is to be performed.

I have abandoned in most cases this method, especially in cases that come to me at an age where it is possible by preoperative care to cause the cleft to become narrower through pressure brought about by adhesive tape.

After the lip is closed the sphincter-like action of the orbicularis muscle will continue to mold the alveolar cleft so that its borders approximate and in some cases closure takes place. If, however, the borders fail to unite, I usually cauterize the borders in order to obtain a complete organization of the approximating borders to obtain union. If the patient is at an age when

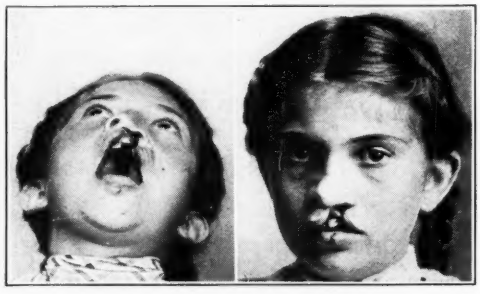
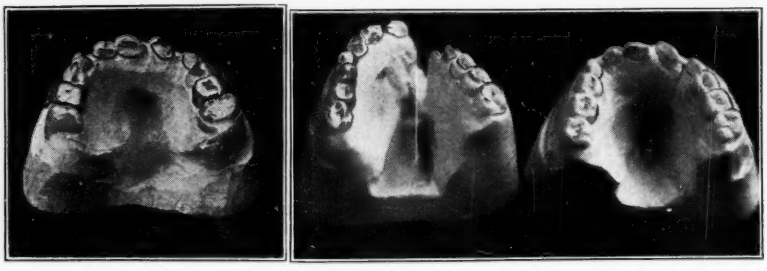


Fig. 15.—A complete cleft palate and hare lip.



A. *B.*

Fig. 16. Fig. 17.

Fig. 16.—Showing method of immobilizing the fractured bone with an alignment wire to which the anterior teeth were ligated.

Fig. 17.—*(A)* Plaster cast before operation, showing divided upper arch. *(B)* Plaster cast after operation and the arch ready for orthodontic treatment.

the strapping of the adhesive tape will not cause a narrowing of the alveolar cleft, I close the cleft by producing a green stick fracture of the alveolar process, thereby preserving the shape of the dental arch. This is best illustrated in the following case:

Patient, E. S.; female, 9 years; excellent health; had congenital cleft of the lip, alveolar process and soft palate (see illustration, Fig. 15). Notice the alveolar process is divided between the left central and the rudimentary left lateral. The alveolar process on the right side was turned outward and protruded to such an extent that it caused a distortion in that region. It was necessary to reconstruct the shape of the dental arch before doing anything further. The patient was anesthetized under ether, and incision

was made between the right deciduous canine and right permanent lateral. The muco-periostial flaps were raised and retracted, the exposed bone was cut one-half its thickness by a narrow, long fissure bur; then by forcible pressure the protruding alveolar process containing the lateral and two centrals was brought in contact with the alveolar process on the opposite side, thus producing a green stick fracture. The borders of the cleft were freshened and held together with an orthodontic appliance (see illustration, Fig. 16). The patient's mouth was kept as clean as possible and four weeks later after union had taken place, the appliance was removed. This operation restored to a fair degree the shape of the dental arch (see illustration, Fig. 17), and as a result the cleft of the lip became narrower. When I operated upon the patient the second time for the correction of the lip, I obtained better results than if I had attempted closing the lip before the shape of the dental arch had been restored. (See illustration, Fig. 18.)

Fig. 18.—Result after operation.

After the correction of the alveolar cleft and the cleft of the lip, the patient is usually discharged for about six months, at which time the cleft of the palate is closed.

Should there be a double alveolar cleft where the central portion of the os incisium is displaced forward and attached to the tip of the nose, I usually cut the vomer to allow the septum to overlap when the protruding os incisium is forced backwards. Then by passing wire suture through the vomer, and freshening the approximating surfaces of the borders of the alveolar cleft, good results are obtained. (See illustration, Fig. 19.) The lip then is closed several weeks later.

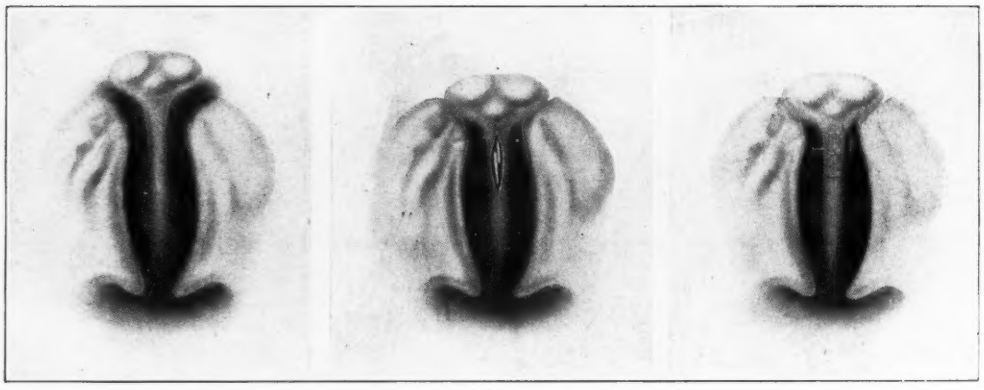
In cases where the patient is older and the teeth are erupting, I find that cutting of the vomer is not sufficient to force the protruding os incisium into its new position. In these cases I resort to orthodontic care (see illustra-

tion, Fig. 20). Bands with buccal tubing are fitted and cemented to the molar teeth and alignment wire fitted to the arch to rest on the incisors, passing through the buccal tubing. Hooks are soldered to the alignment wire; rubber bands are then stretched from the buccal tubing to the hooks. These rubber bands are to be replaced daily. After the patient is accustomed to the orthodontic appliance, I operate on the vomer by doing a submucous resection.

The orthodontic treatment will then gradually shift the protruding mass in its position. The borders are then cauterized to promote fusing of the tissue. The lip is then operated on.

If, however, the os incisivum is undeveloped, the teeth decayed, pulps diseased, and there is a chronic inflammatory process going on, I find it advisable to remove the protruding mass. This is done by stripping loose the soft tissue and suturing it across the gap to act as a good stump for restoration with artificial teeth.

In my experience in the repair of alveolar clefts, I find that after having



A. *B.* *C.*

Fig. 19.—*(A)* A drawing of the palatal view to show the double cleft and protruding premaxillary of patient shown in Fig. 13 before operating.
(B) Showing the vomer cut so that the os incisivum can be forced into its new position.
(C) Showing the premaxillary bone wired in its new position.

followed the Brophy method closely in operating on these defects I would frequently destroy some of the tooth buds. I have also observed that the end results of this technic by excellent cleft palate operators, were similar to my results. The loss of several teeth would prevent the upper jaw from normally developing and had a tendency to start a so-called progressive malocclusion, the upper jaw remaining stunted, leaves the patient after the passing of years with an infantile jaw called Micrognathia.

The lower jaw appears to protrude and the upper jaw is undeveloped. While it is true that many of these cases can be benefited by orthodontic care, orthodontists agree that to accomplish this there must be a sufficient number of teeth to stimulate growth of the jaw for normal development.

By observing Fig. 21 you will notice a number of teeth missing. It is a cast of the upper jaw of a young lad who was operated on for cleft palate in infancy. The parents informed me that the patient was two months of

age when the operation was performed; that wire was passed through the jaw and then through lead plates on each side of the arch; that these wires were twisted until the front of the cleft was closed, and since the operation nothing was done to close the remaining part of the palatal cleft.

The upper arch appeared undeveloped and the lower jaw protruded. This inharmonious relation of the arches gave the boy a rather unpleasing appearance. The premolars, left lateral and the right canine were missing. The only permanent teeth in the upper jaw that had erupted were 621:16.

The other teeth are deciduous. The centrals are in marked linguoversion. The missing teeth, no doubt, were brought about by the operation in the attempt to close the cleft. While this may not happen to operators who claim that the passing of wire through the jaw to repair a cleft does not destroy the tooth buds, I am of the opinion that this method of operating for the repair of the cleft will destroy tooth buds in the majority of operations that are done in this way. The loss of a number of permanent teeth in a con-

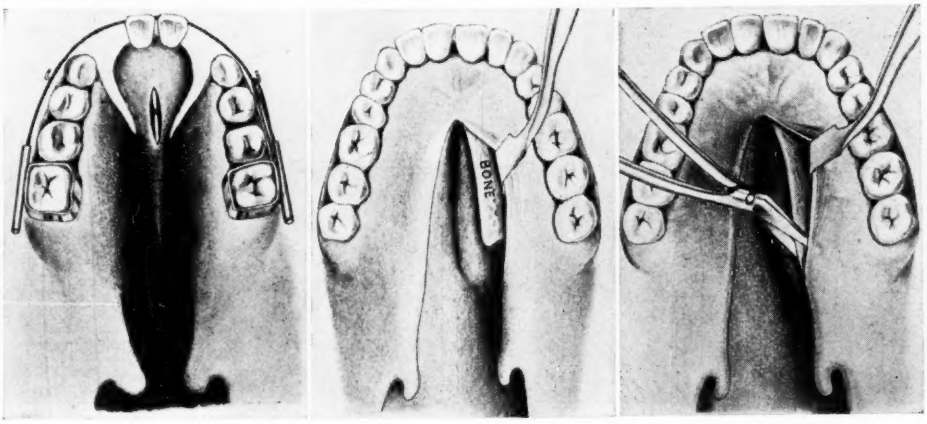


Fig. 20. Fig. 21. Fig. 22.

Fig. 20.—Illustrates a method of drawing the protruding premaxillary backwards.

Fig. 21.—Separating the soft tissues from the bone.

Fig. 22.—Cutting the tissue loose from the posterior surface of the horizontal plates of the palate bone.

tracted and underdeveloped upper arch is difficult to correct by orthodontic care.

Such cases have been treated by us for a number of years. While the improvement was remarkable, we can never hope for results as beautiful and effective as when the teeth are not missing. Let us compare this case to Fig. 22. This shows the result which can be achieved in developing the upper jaw, restoring the forces of mastication, improving the facial lines and enlarging the nasal channels. In this case there were a sufficient number of teeth to fit the proper appliance to obtain the right results. The object of comparing these two cases is to impress upon operators the importance of preserving the deciduous and permanent teeth when operating upon cleft palate cases, in order to permit further care, if necessary, through orthodontic means.

After the alveolar cleft and hare lip is repaired, the next step is, the

closing of the palatal cleft. Before attempting to repair a cleft of the hard and soft palate, the operator should be well informed on the advantage and disadvantage of surgical care or the substituting of an obturator for the restoration of function.

I have observed in my experience a large number of cases where surgery was resorted to for the correction of a cleft palate, the end result being anything but satisfactory.

While the opening was closed, the soft palate was so short and immovable from the large amount of scar tissue that function was impossible. In other cases I have observed patients wearing an artificial palate and velum which did little or no good to improve function.

I do not consider that a set of unalterable regulations can be established as to whether a mechanical substitute or surgical correction is best suited for the patient, but I do know that unless one has had a training in correct-

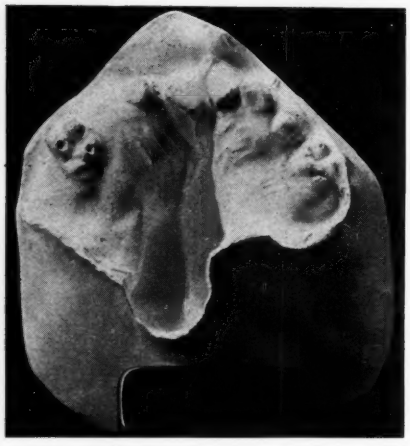


Fig. 23.

Fig. 24.

Fig. 23.—Cast showing the loss of a number of permanent teeth from injury by passing wire through the arch in the attempt to close the cleft.

Fig. 24.—A marked deformity which was corrected by orthodontic care.

ing a cleft palate by mechanical restoration and surgical repair he cannot be in a position to judge what is best fitted for the patient's welfare.

The oral surgeon who manifests a desire to give his patient that which is best, cannot ignore the value of an artificial palate. In cases where surgical correction has its limitations, the crude methods that have been employed by a large number of surgeons to close a cleft palate by making long lateral incisions, or the reflected flap method, may, and frequently do, close the cleft. The result as far as function goes must be considered a failure. Unless one is satisfied that there is a sufficient amount of tissue to bridge over the gap and the soft palate can be lengthened to establish a functionating velum, then it is far better to advise the patient to wear an artificial palate.

For a number of years I followed the methods of the world's best oral surgeons for the surgical repair of a cleft of the hard and soft palate. In some of the cases the result was excellent—some were a partial failure, and

in a large number a complete failure. While I could usually approximate the borders of the cleft after freeing of the muco-periosteal flaps, without making lateral incisions, I found it a difficult task to overcome lateral tension. If I made lateral incisions, scar tissue would fill in the lateral wounds and the result would be a short and stiff drum-like palate. While the cleft was usually closed I could not feel else but that my results and the cases operated on by others were not as they should be.

Ten years ago I adopted a new method for the relief of lateral tension which would overcome the necessity of making lateral incisions. In 1916 I reported my results before the Kansas City Dental Society. Since that time I have applied this method in every case for the repair of a cleft of the

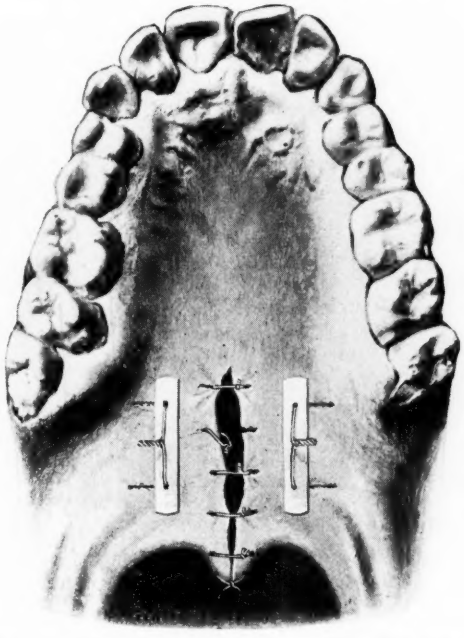


Fig. 25.—Showing wire cutting through soft tissue; therefore, not overcoming lateral tension.

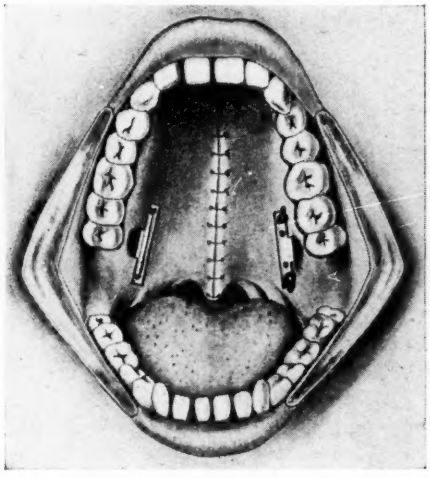


Fig. 26.

hard and soft palate with results far better than any method I had followed heretofore.

In order to fully appreciate my method in the relief of lateral tension in cleft palate operations, I will describe the technic of combined uranoplasty and staphylorrhaphy. The method universally employed is Langenbeck's, which consists of the following steps:

1. Freeing of muco-periosteal flaps.
2. Freshening the edges of the cleft.
3. Placing and tying of sutures.
4. Relief of lateral tension.

Freeing of the Muco-Periosteal Flaps. This procedure is accomplished by cutting the mucous membrane along the entire borders of the cleft and separating the soft tissue by periosteal elevators and cutting the tissue loose from the distal surface of the horizontal plates of the palate bone. (See

illustration, Fig. 23 and Fig. 24.) This should be done with great care in order to prevent tearing or lacerating, which may seriously impair nutrition. Naturally this brings on considerable hemorrhage, which can be stopped

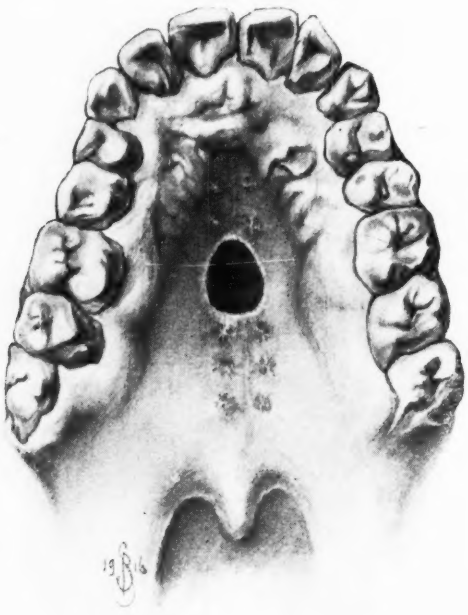


Fig. 27.

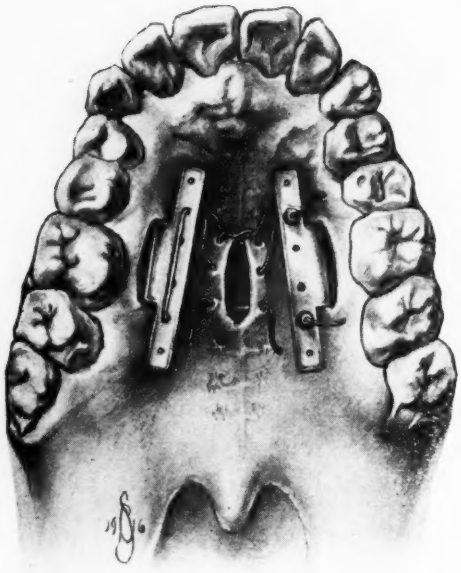


Fig. 28.

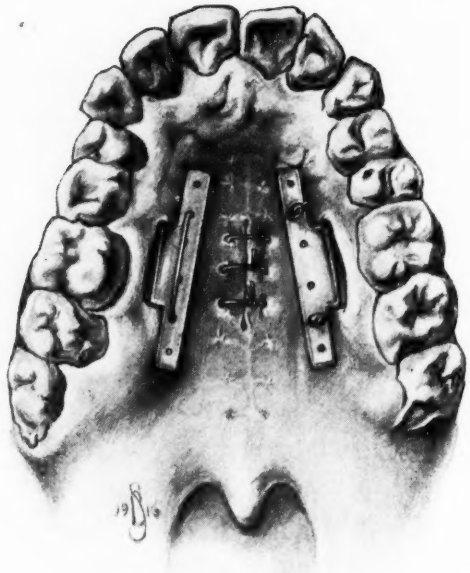


Fig. 29.

by firmly pressing a gauze sponge against the bleeding surface. It is not always possible to avoid wounding the anterior palatine and especially the posterior palatine artery. Should one of the vessels be nicked it will cause severe and prolonged hemorrhage. It is therefore better to completely divide

the vessel so that it will contract as it ends, thereby overcoming protracted bleeding.

Freshening the Edges of the Cleft. This can best be accomplished by grasping the uvula on one side with a catch forceps and putting tension on the soft tissues; then with a very sharp thin-bladed knife cut a thin marginal strip along the entire flap from the uvula to the apex of the cleft. This same procedure is to be carried out on the opposite side. The freshened surface should be cut square with the flap tissue. A beveled surface is conducive to inviting failure. If the raw surfaces are cut square, it is an easy matter to bring them together in close apposition which will enable rapid union during the healing period. In cases where there seems to be a shortage of tissue in the soft palate I prefer to split the border of the velum about one-eighth of an inch and then unite the raw surfaces.

Placing and Tying of Sutures. Various kinds of suture material have been adopted for holding the pared edges together, such as silk, horse-hair, linen, catgut, wire, etc. Personally I do not believe that the difference in value of the above named suture material is of any great consequence, providing the

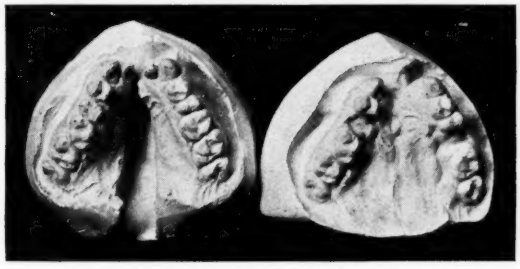


Fig. 30.

operator does not depend upon the same to overcome lateral tension. Sir William Ferguson, in 1844, recognized that the tension on the ligatures frequently invited failure, either through their cutting out or by shutting off the circulation, thereby bringing on starvation, necrosis, and infection. To overcome this tension Ferguson divided the levator palati, the palato-glossi and the palato-pharyngeal muscles. In 1860 Dr. Agnew believed that the tensor palati muscles were responsible by pulling the newly approximated surfaces on the soft palate apart, thus causing the sutures to pull out. Therefore he advocated making an incision close to the hamular process of the sphenoid bone, and in this way overcoming tension. For a long time these methods were extensively adopted by operators in this and foreign countries. The end results were not satisfactory. This was pointed out in a paper by Dr. T. W. Brophy in 1901, in which he says, "The formation of cicatrices following incision renders the soft palate thick and unyielding, so that its function is performed imperfectly." Dr. Brophy finds it unnecessary to cut the muscles on either side; it was he who introduced the application of lead plates. The advantages claimed for these plates are to render the palate inflexible and the prevention of the cutting out of the sutures. Dr. Blair reports that he has discontinued the use of

lead plates as a retention device because they occasionally caused sloughing, in spite of every care; he depends entirely upon the sufficient freeing of the flaps. In my experiences I have never found that the plates cause sloughing, but that they did not prevent the suture from cutting through. (See illustration, Fig. 25.) They are, however, of a distinct advantage in rendering the palate inflexible. In order to prevent the cutting of the suture through the soft tissue I have devised a new tension plate which will prevent the suture material from cutting out and at the same time relieve the tension as well as render the palatal tissues inflexible. These plates are made from noncorrosive metal B.I.B. American gauge 22, in various sizes.

The object of these plates is to prevent the cutting out of the wire ligature which frequently happens with the Brophy plates. In order to fit these plates it is necessary to make a small incision near the gingival border of the last molar, being careful not to cut the palatine artery. (The operator must take into consideration the degree of the cleft, the position of the blood vessels and the size of plate that best suits his purpose.) The incision should be of sufficient length to permit the flange of the plate to enter and lie between the palatal bone and soft tissue. Previous to fitting these plates it is necessary to pass silver wire (American gauge 24) through the mucoperiosteal flaps and then through the holes in the plates. The ends of the wire are then passed through perforated lead shot and made tense by pulling the wire and crushing the shot after the borders of the flaps can be approximated without tension. After this is done I denude the border of the cleft and then place and tie the coaptating sutures after the McCurdy method.

While to the beginner it is rather a difficult procedure to properly fit these plates, he can, with a little patience, soon master the technic of this simple procedure as an aid in obtaining uniform anatomical as well as physiological results.

Fig. 26 is a palatal view of the cleft closed, with the plates in position. When these plates are properly fitted and placed in position, and held so with wire ligature, there should be no tension of the ligatures holding the borders of the cleft together.

Fig. 27 illustrates the so-called button hole opening in the center of the palate. This form of opening usually is the end result in the attempt to close the hard and soft palate.

Figs. 28 and 29 show the advantage of using the author's tension plates for closing the opening.

Fig. 30 shows the cleft involving the hard and soft palate, and the result after the operation. This case was operated on, the patient being thirty years of age, and was done in one operation by using the author's tension plates.

QUARTZ LAMP THERAPY IN ORAL CONDITIONS

By Louis B. Lippman, D.D.S., New York City

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SINCE sunlight is necessary to life and health, investigators have attempted to reproduce it by artificial means. These experiments have led to the manufacture of different types of lamps, each with a definite therapeutic value.

A ray of sunlight is composed of various bands of color, which are separable by different color screens. These bands range from red to violet in the visible spectrum. Beyond these visible rays are shorter invisible rays, the infra-red at one end of the spectrum and the ultra-violet at the other. The infra-red are the heat-producing rays, while the ultra-violet are the actinic or chemical rays, and are recognized by their action on photographic plates.

Although sunlight is used as a therapeutic agent, its more general use is limited, since its value depends on atmospheric conditions and location. At high altitudes the sun's rays are richer in the ultra-violet rays than at the ordinary levels of the earth, owing to the absorption of these rays by moisture and dust particles.

In comparatively recent years electric light has come into its own as a therapeutic agent. Although valuable as such, the beams of light produced by an ordinary electric lamp differ from those of the sun in that a very small quantity of ultra-violet rays are produced, and those that are present are absorbed by the glass.

Light is readily absorbed by the tissues. This absorption stimulates cell activity, thereby increasing the processes of metabolism. According to Doctor George White Starr, "The yellow and violet rays of the spectrum produce a maximum of energy in all the vital processes, with a more complete metamorphosis prevailing under the influence of the violet light."

Experiments by Bovie and Berg have shown that the ultra-violet rays will destroy bacteria within five minutes. Ordinarily, chemicals used in strength sufficient to destroy bacteria are also cytocidal. The ultra-violet rays, however, if properly used, are not cell-destructive. Therefore, a means of applying these rays in conditions requiring cell stimulation, bactericidal action, or both, offers a valuable therapeutic agent.

Finsen, Aarons, Kuch, and Kromayer experimented with different types of lamps. From these experiments evolved the present quartz lamp which produces a powerful violet light, rich in ultra-violet rays.

Quartz light therapy is being used by physicians with marked success, especially in the treatment of skin diseases and chronic suppurating condi-

tions. Its application has even been successful in the treatment of certain types of baldness. The results obtained with the quartz lamp at the Naval Hospital, Brooklyn, N. Y., led the writer, while stationed there, to attempt its use in oral conditions. Suitable applicators were designed, and a series of cases, ranging from simple gingivitis to morbid pyorrhea, were placed under treatment. In those cases where much loss of process existed no marked change was noted in the firmness of the teeth. But in all the cases treated, all purulent discharge was stopped and the gums resumed a healthy tone. Bacteriologic examination exposed the presence of Vincent's bacilli, which proved negative after the fifth treatment in the less severe cases, and after the tenth in the worst.

At that time treatment was commenced with a one-minute exposure, and increased daily by one minute for four days, after which five-minute exposures were made. Since then the light has been applied in cases other than pyorrhea, such as Vincent's Angina, cellulitis, periostitis, neuralgia, postoperative pains, and in all postoperative procedure about the mouth, with most gratifying results.

Treatment must be intensive while it lasts. Since it is not practicable in private practice for most patients to appear daily for treatment, it has been necessary to somewhat alter the technic. Unfortunately, no definite law can be made for the length of exposure. People of light complexion will react more readily than those who are dark. It is necessary that the operator depend a great deal on his own judgment. It is best to start with short exposures and gradually work up to longer ones.

The penetration of the rays is dependent on the following factors: distance at which the applicator is held from the point of application, current strength, and length of exposure. Where deep penetration is desired, as in pyorrhea, abscess conditions, periostitis, etc., the applicator is brought into contact with the tissues under pressure, causing dehematization, and treatment is begun with a two or three minute exposure, and each successive treatment is increased by two or three minutes until five or eight minutes are given. In exposing open wounds in the mouth to the rays, the applicator is held from one-half to one inch from the wound and treatment may be begun with three or four minute exposures and be gradually increased up to ten minutes.

The moist mucous membranes will stand a greater exposure than the skin. Therefore, when the rays are applied externally, the applicator is held from three to four inches from the skin, and two to four minute exposures are usually sufficient.

Reaction occurs within about five hours after exposure, and manifests itself in a slight reddening of the skin, growing more tan with each successive exposure, simulating a sunburn. After treatment is stopped the skin will peel and gradually reassume its normal color.

Too great an exposure may result in severe reactions and form vesicles on the mucous membrane or a painful burn on the skin. The pain and discomfort are temporary and usually disappear in two or three days. If a

burn occurs, treatment should be stopped until the burn is healed, and then resumed with shorter exposures. Coating the burn with vaseline will hasten recovery.

In conclusion it may be said that ultra-violet ray therapy has a distinct field of usefulness in the treatment of oral conditions, and that the beneficial effects derived therefrom are dependent on the following factors:

(1) It is germicidal in action.

(2) It stimulates cell-activity, thereby promoting phagocytosis and the processes of metabolism.

(3) It exerts an oxydizing action on the blood.

(4) It eliminates to a great extent the use of chemicals which, beside being germicidal, are also cytocidal.

(5) It produces an analgesic effect on terminal nerve fibres.

(6) Its proper application involves no pain or discomfort for the patient.

DEPARTMENT OF DENTAL AND ORAL RADIOGRAPHY

Edited By
Clarence O. Simpson, M.D., D.D.S., and Howard R. Raper, D.D.S.

THE TECHNIC OF ORAL RADIOGRAPHY

By Dr. Clarence O. Simpson, St. Louis

INTRODUCTION

IN the otherwise excellent textbooks on oral radiography, comparatively little space has been devoted to the operative technic and the detail so essential to proficiency in technical procedure. As evidence of the slight consideration given to systematic methods in radiodontic examinations, attention is directed to the haphazard technic and mediocre results generally prevailing after more than twenty-five years during which the x-ray has been used in oral diagnosis.

Contributors to periodic literature have occasionally proclaimed a "standardized" technic dealing with generalities, or featuring a complicated system of calculation and intricate appliances, none of which has had sufficient appeal to be extensively adopted.

A sloth said, "Technic is the art of doing a simple act with the utmost difficulty," but since oral radiography is not simple and an attempt will be made to eliminate the avoidable difficulties, further rebuttal in this instance is unnecessary. The common lack of methodical execution, uniformity in results, and adequate diagnostic data in radiodontic examinations is sufficient motive for expounding technic.

Prerequisites for radiodiagnosis are superior negatives and a thorough x-ray examination, without which interpretation is hazardous. Uniformly superior negatives can only be produced by correct methods and attention to detail. A thorough radiographic examination requires a perfect knowledge of the regional anatomy, a keen discrimination of the physiologic and pathologic factors involved, an appreciation of the limitations encountered, and an acute sense of obligation toward the service. These qualifications are acquired only by professional training and extensive clinical experience, and even this preparation is not infallible.

Laws regulating the practice of dentistry specify that, with limited exceptions for students in dental schools and physicians, dental operations may

be performed only by a licensed dentist. The insertion of foreign materials in the mouth of a patient, for the purpose of diagnosis, constitutes the practice of dentistry in the spirit and letter of the definition. The subjection of a patient to the dangers of traumatism and transmission of disease, high voltage electric current, and destructive radiation entails a greater risk than the average dental operation.

In view of the legal and moral restrictions, and the inability of an unqualified operator to make adequate radiodontic examinations, this text is not intended to serve as a manual of instruction for office assistants or laboratory technicians, but to promote a higher standard of radiodontic service by professional practitioners.

The technic to be described was devised by the writer in 1916, when it became evident that system was equally essential in radiographic examinations as other operative procedures, and has proved eminently satisfactory to others who have adopted it. Although simple in principle, an explanation of the important details in obtaining the maximum efficiency with it, requires an extended commentary.

EQUIPMENT

Ingenuity, knowledge and skill may achieve wonders with crude tools, and seductive selling propaganda is conducive to superfluous equipment, but technical excellence is encouraged by suitable appliances and favorable environment.

When radiographic work is done in connection with other dental operations, it is desirable to have a room exclusively for the x-ray examinations. The advantages of this plan in service, safety, and impression, warrant any reasonable sacrifice in office arrangement and it should be considered before purchasing equipment. The operating room should be large enough for convenience, well lighted and ventilated, accessible to the dark room, and afford protection by distance or construction to office associates and employees.

In view of the present excessive production, and the varied types of apparatus offered for sale, the choice of equipment is usually a perplexing problem. A discussion of the characteristics of the different machines being irrelevant and of temporary value due to frequent changes, the reader is referred to the advertising pages of dental periodicals and the obtrusive catalogues for illustrations and description of modern apparatus.

By evolution the static generator, the high frequency coil, and the induction coil have been universally superseded by the interrupterless transformer. The hot cathode tube has now made it possible to dispense with motor rectification and introduced the small mobile equipment. There are several experienced, reliable manufacturers supplying suitable apparatus for oral radiography, and by consulting one who has different models, the relative merits will be better presented than by a dealer with only one type.

The floor space often influences the selection of radiographic apparatus, as the unit type can be used in a small operating room which would not accommodate a more elaborate outfit. However, when the space is available, a rectifying transformer with a reserve capacity, a convenient tube stand, and

overhead transmission of the high voltage current will prove more satisfactory to an earnest practitioner. This installation has the advantages of rectified current for either gas or Coolidge tubes, surplus energy with variable control, every facility in manipulation, and the greatest protection for the operator by permitting the use of a protection screen.

The Transformer.—The capacity of the transformer is of more importance than the type, and one delivering a voltage equivalent to a 5-inch "back up" (commonly called a 5-inch machine), and 35 milliamperes is desirable for oral

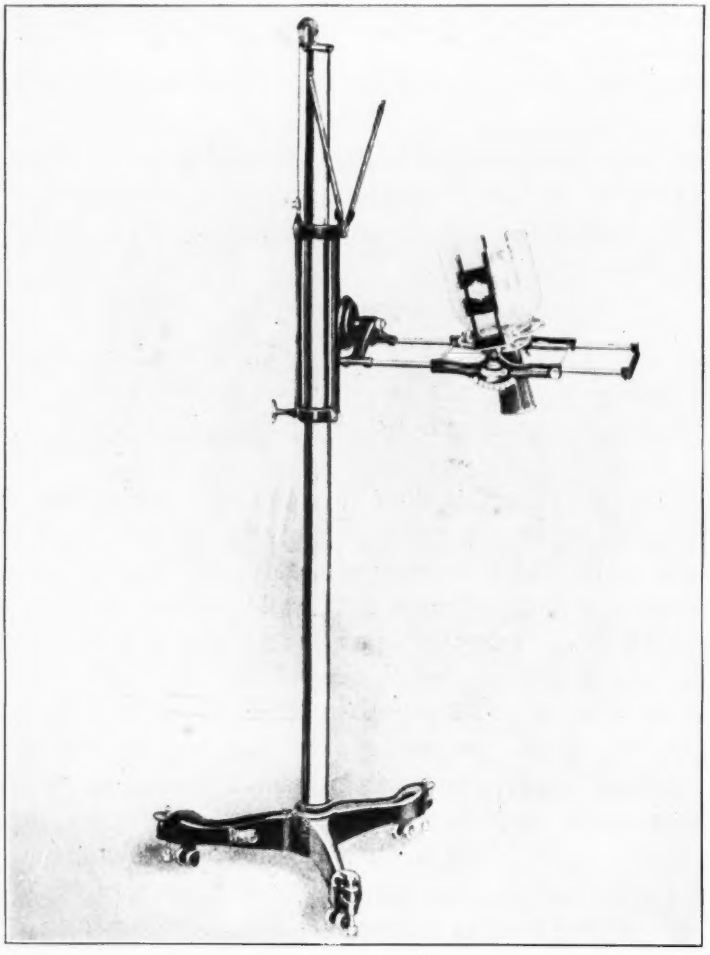

Fig. 1.—The type of tube stand most efficient and convenient for oral radiography.

radiography. This will supply ample power for all requirements, and provide some reserve capacity under usual operating conditions which is a maintenance factor in all machinery. A selective control for regulating the current to demand is decidedly preferable to the fixed voltage of some models.

The operation of the transformer is an insignificant phase of radiography, and an "automatic machine" of limited efficiency is an inauspicious preparation for the intelligent practice of radiodontia. There are frequent indications for changes in voltage and milliamperage in skillful operating, and adequate provisions should be made for such regulation. Foot switches have mechanical

limitations, are likely to be accidentally closed, and should not be used except when necessary to enable the operator to keep out of tube range. Circuit breakers and stabilizers which have recently been added to some transformers are useful accessories, but not essential under favorable operating conditions.

The Tube Stand.—A separate tube stand of appropriate design gives an unlimited range of adjustment, reduces the vibration of the tube during exposure, and obviates the necessity for placing the transformer near the patient. The tube stand is the chief medium of angulation, and certain features of construction determine the utility of it. An inconvenient stand causes unnecessary danger, additional labor, difficult poses, and constant annoyance because of the many changes in position required. To assure facility in operating, one should be familiar with the manipulation of a tube stand before buy-

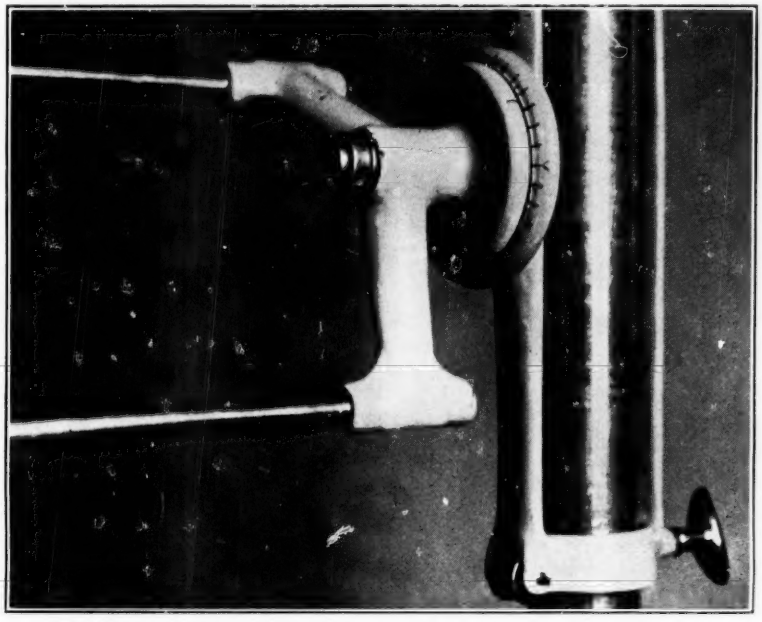

Fig. 2.—The calibration which may be added to the tube stand shown in Fig. 1, to determine the vertico-horizontal angle of the central rays.

ing it. The requirements of oral radiography have not been considered in designing tube stands, and those which are adaptable, are rarely recommended for the purpose by dealers.

The stand should be rigid, well balanced, easily moved, and whenever possible have friction adjustments instead of locking devices. All adjustments should be calibrated, the rotary ones in degrees, and the straight in quarter inches, for refinement in technic is attained by accurate calculation—not by guessing.

The tube carrier should have sufficient range of vertical movement to allow of its being raised well above the head of a tall subject, and a horizontal extension which will permit the tube's being passed to the opposite side of the chair. The tube supports should guard the patient from contact with the high tension wires, without any part projecting to interfere with the desired positions.

A stereoscopic shift and centering movement with compensating adjustment for different target-film distances should be included in the construction. The usual arrangement for stereoscopic radiography is incorrect, and

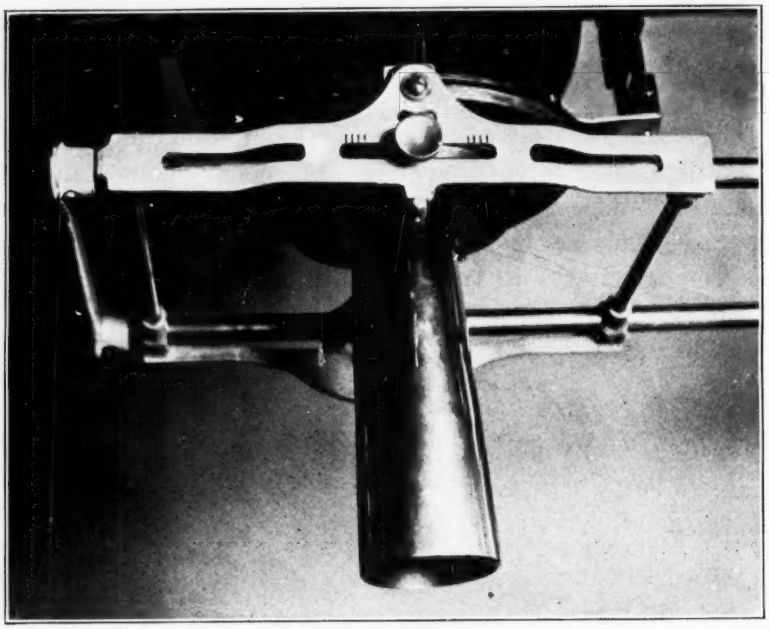

Fig. 3.—Illustrating the calibration which may be added to most tube stands for correction of the stereoscopic shift.

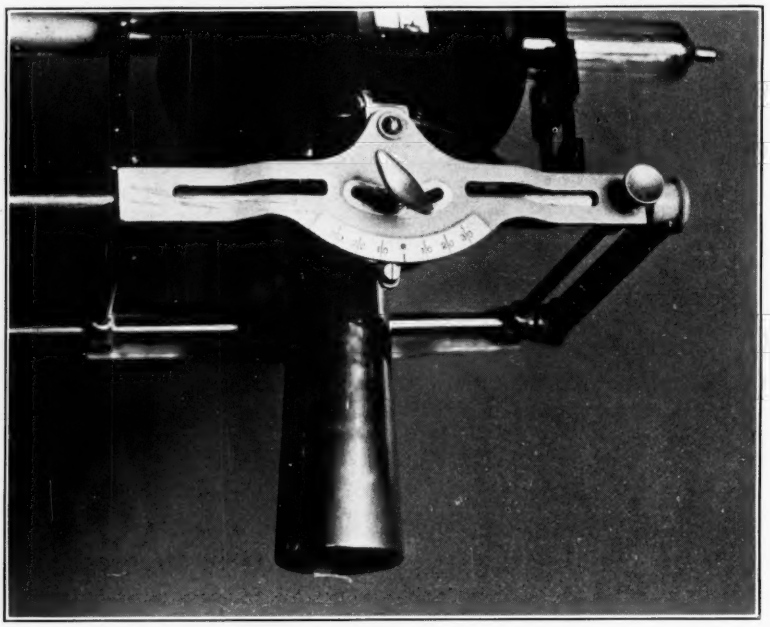

Fig. 4.—The calibration of the tube stand shown in Fig. 1, which may be used to determine the mesiodistal angle of the central rays.

evidently is added as a selling feature, without knowledge of its proper use.

The assortment of cones included in the equipment should consist of at least three of the following general dimensions: One not more than 2½

inches in diameter and sufficiently long to maintain the proper target-film distance, for routine intraoral examinations. Another about 3 inches in diameter and 6 inches shorter than the first mentioned, for occlusal views and hurried examinations of intractable subjects. A third about 5 inches in diameter and 9 inches long, for extraoral and sinus examinations. The diaphragm opening should be the smallest permissible with the cylinder in use, and a supplemental diaphragm may be advantageously used with some cones of incorrect proportions.

With adequate penetration, a filter is not essential for protection of the patient, but a sheet of aluminum no more than ¼ of a millimeter in thickness is useful in absorbing scattered radiation from the walls of the tube and in obstructing the illumination and heat which may arouse the fears or untimely interest of the patient.

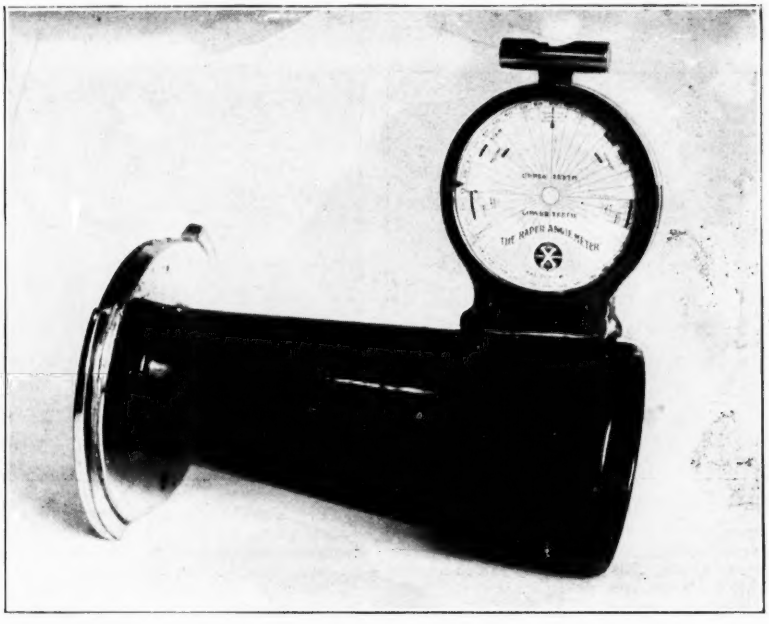

Fig. 5.—The Raper angle meter which may be attached to any cone or pointer for determining the vertico-horizontal angle.

Tubes.—No branch of radiography demands sharper definition than that for oral diagnosis, and the tube as the source of radiation has a marked bearing on the quality of the negatives. The inherent characteristics of a tube cannot be materially altered by manipulation, and are analogous to the correction of the lens in photography. Lenses are chosen for definite purposes; likewise in radiology tubes should be selected for a specific use.

The gas or ordinary tube has almost become obsolete through the popularity of the Coolidge or electron tube with its advantages of stability and ease of operation. However, the gas tube gives a characteristic radiation most gratifying in contrast and definition, which, to a marked degree, compensates for the difficulties incident to its use. With reasonable experience and care gas tubes can be utilized in radiodontia without great inconvenience, but this statement is not intended to tempt any one who is satisfied with the properties of Coolidge tubes.

The precautions in operating gas tubes are a period of seasoning to stabilize them and the avoidance of excessive heating and reduction of the vacuum. The seasoning is accomplished by a repeated gradual heating of the tube and after two or three exposures, allowing it to cool. Any reduction required in the early use of a tube must be made on the lowest voltage of the transformer and the wire detached from the reduction chamber before making exposures. As the tube becomes harder from use, the voltage for reduction is gradually increased and the wire left attached to the chamber unless the penetration drops below the desired amount. When it becomes necessary, a tube may be reduced with the same voltage as used for exposures, which is a method generally supposed to be destructive to the tube but in practice extends the period of service in a hard tube.

Coolidge or hot cathode tubes are entirely mechanical in operation and require no special skill or experience. The cathode filament must be heated before the secondary current will pass through the tube, and the milliamperage

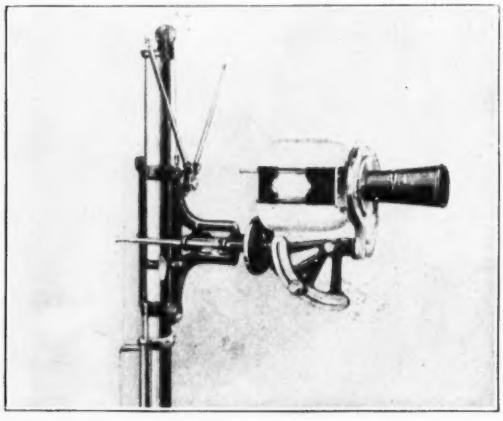

Fig. 6.—A type of tube stand unsuitable for intraoral radiography because of the tube support interfering with some positions. Inverting the tube carrier to avoid this difficulty necessitates reversal of the tube or the polarity.

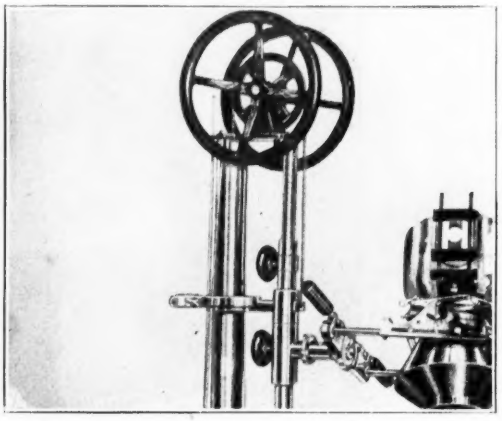

Fig. 7.—A type of tube stand which has superfluous parts at the top likely to interfere with the terminal wires, and is laborious to operate because of the locking devices required to hold the tube in position.

is governed by the degree of heat which is controlled by the filament rheostat with precision in the absence of line fluctuation. By determining the proper setting of the filament rheostat and the transformer rheostat controlling the voltage, the tube operation becomes merely a matter of closing switches. The manipulation has been further simplified in unit apparatus by having the filament circuit closed automatically by the transformer switch.

The Focal Spot.—The size of the focal spot, or area of the target upon which the cathode stream is focused, is the most decisive feature of tube construction, in determining the character of radiographic negatives. With other factors constant, a small focal spot produces an image which is sharper in detail and more nearly the true size of the object than would a large focal spot. There is no standard gauge for focal spots but those less than 5 mm. in diameter would generally be considered fine; those from 5 mm. to 8 mm., medium; and those over 8 mm., broad.

After a tube has been used for a time the target will show a marking

from the impact of the cathode stream which is the approximate size of the focal spot. An accurate method of determining the size of the focal spot is to interpose a sheet of lead with a pinhole equidistant from the target and film, and radiograph the source of the rays. The lead need not be more than $\frac{1}{16}$ of an inch thick, the pinhole should be the size of a No. 10 needle, and the sides of the opening slightly reamed to remove irregular margins. If the lead is placed about 12 inches from the target and film and an exposure of 20 seconds made, any wavering of the focal spot will be registered. A striking illustration of the effect of different focal spots may be shown by radiographing a wire or a wire screen suspended half way between the target and film.

The requirements of intraoral radiography indicate the finest focal spot

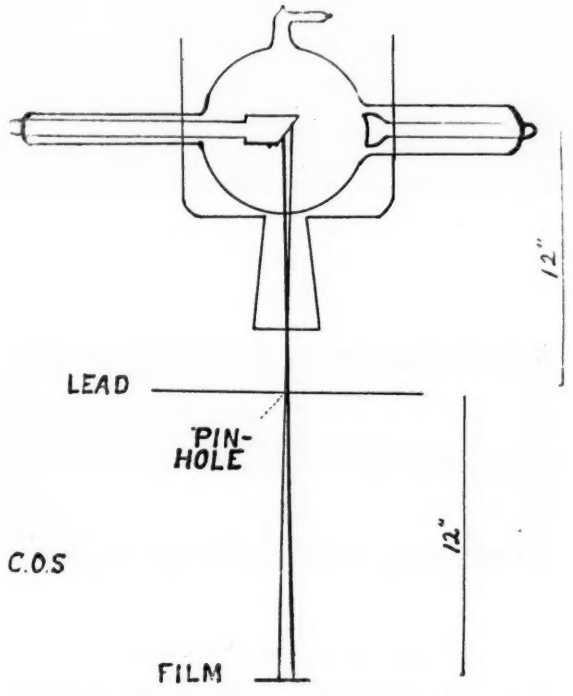

Fig. 8.—A method of radiographing the focal spot.

practicable, which is about 2 mm. for 10 ma.; 3 mm. for 20 ma.; and 4 mm. for 30 ma., with a spark gap of 4 to 5 inches. The target will be fused by a focal spot smaller than the above proportions, unless short interrupted exposures are used to permit the dissipation of heat. In ordering tubes the size of the focal spot and the milliamperage used should be specified and proved by test before acceptance, and it will be found that the focal spot usually increases in size from use. Tube manufacturers are disinclined to supply tubes with a small focal spot because the difficulty in adjusting a fine focus limits the production, and improper use of such tubes is likely to cause complaint. Consequently, little dependence can be placed in a "fine focus" label on a tube, or a convincing statement to that effect by the dealer. Know the type of tube suitable for your work, insist upon getting it, and do not abuse it.

The Chair.—Apparently there is no unanimity of opinion on a suitable

chair for oral radiography. Some operators use a "specialist's" chair, others a straightback chair with a detachable headrest, and illustrations of apparatus even show the patient standing for the examination.

After experimenting with many styles of special chairs, the writer has found a dental chair the most efficient and convenient. The advantages of the modern dental chair are: rigidity, ease and range of adjustment, revolving

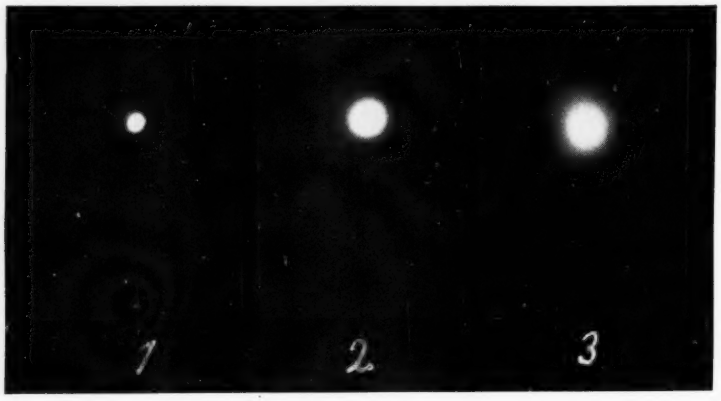

Fig. 9.—Radiographic images of focal spots obtained by the method illustrated in Fig. 8. The first is of a tube most desirable for intraoral radiography. The second is of a serviceable tube, but about the largest focal spot indicated for intraoral radiography. The third is of an inferior tube which will not produce sharp definition because of a flare or wavering of the focal spot.

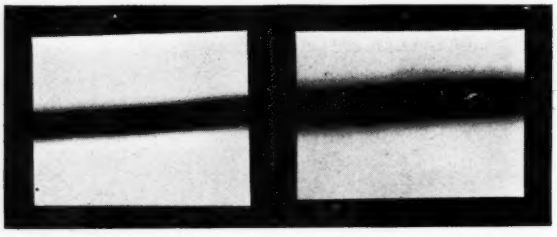

Fig. 10.—Wire test of a fine and a medium focal spot.

without changing the distance from the tube stand, and more comfort than other operating chairs. The objection of the metal parts acting as an electric conductor is negligible in comparison with the "grounded" metal tables universally used by general radiographers, and the possibility of secondary radiation from the metal is excluded by the lead backing of film packets.

In using a dental chair for radiography some operators have dispensed with the entire foot board, but this too greatly detracts from the comfort of the patient, and subsequent illustrations of positions will demonstrate how to avoid interference with the tube stand.

(To be continued.)

RADIODONTIC RIDDLES

Conducted by Clarence O. Simpson, M.D., D.D.S.

A Department Devoted to Discussion of the Scientific, Technical, and Ethical Problems of Radiodontia

Putting the Kick in Ethics

Q.—Will the revised code of ethics recently adopted by the American Dental Association eliminate the commercial x-ray laboratories?

A.—No, if the laws regulating the practice of dentistry which prohibit unlicensed operators and the use of a firm name are not enforced, the code of ethics which is only intended to guide men without professional instincts, will not eradicate the commercial laboratories.

The new code demonstrates progress by specifically stating that it is unprofessional to pay or accept commissions on fees for radiograms, and in other restrictions of professional conduct which should discipline the instigator of, and accessory to, mercantile radiography. From this reference to radiograms, do not think that the value of professional radiodontia is recognized and given special protection by the A. D. A.; rather it is because radiography is so putridly commercialized that it demands action by the ethical authorities to protect the reputation of the Association.

The revised code of ethics declares the welfare of the patient to be paramount to every other consideration, and should be conserved to the utmost of the practitioner's ability. What sort of consideration does the welfare of the patient have when an x-ray mechanic is recommended for a professional service, or an office girl is entrusted with an x-ray examination by the ethical (?) practitioner?

The code of ethics defines it as unprofessional for a dentist to advertise, to call attention to special methods, or to proclaim superior skill. Then is it not equally unprofessional for a dentist to refer patients to those who do advertise, call attention, and claim?

The x-ray laboratories will continue to "graft" from the ignorant public, so long as "piker" dentists support them, to produce low-priced, high-mortality dentistry; and a code of ethics will never make professional men of the dentists who collect and carry a bag of free samples at every convention.

In this relation it is a pleasure to quote the following extracts from *The Chicago Dental Society Bulletin,* in which Dr. L. E. Jelinek, Chairman of the Society's Board of Censors, publishes a timely interpretation of the new code. To forestall technical evasions, Dr. Jelinek has transposed the "shall

nots'' to simple words and illustrations which cannot be misunderstood by those who are commercially inclined and resist comprehension, and which should straighten some crooks and roughen the path of the slippery boys who try to cheat without losing their society affiliations.

''But we have not done with the subject. There remain the all too common signs (and printing, too) of the 'Gas given' or 'Gas administered' and 'X-ray.'

''It would seem that imagination stretched to its utmost could not classify any of these signs as name, title, address, telephone number, or office hours which is *all* that is permitted (unless in the case of a bona fide Specialist) by the second half of this section, it being most explicit on this point.

''The many who are guilty of this public flouting of their equipment, deceive themselves (if we dared to shock our Editor's well-known sense of propriety, we would use the word 'kid' instead of deceive,—it would fit in most beautifully) into believing that these signs are of immense value to them financially. They are not. We venture to say that if a comparison were made between two men in the same neighborhood, the one having these signs and the other being a real fellow, we would doubtless find that the latter did as much 'business' as the former and, quite likely, a little more. No, Brother, the motives underlying these signs are unworthy of you. You were probably inoculated with one of the motives by the irresistible salesman of equipment who painted a beautiful picture (as only he can) of how, by buying the Gas outfit and x-ray machine from him, and releasing this all important information to the restless public via the sign outlet, you will have arrived, and that both outfits will pay for themselves from increased income in less than six months.

''As a matter of fact, patients that come to you through any other manner than that of personal acquaintance or by recommendation of other patients of yours, are seldom desirable.

''Another motive, in having these signs, is self-elevation above your neighbor. You have something which he has not (?)—at least his trumpets do not blare out the fact through the medium of degrading signs, (at that, he may have had both outfits long before you did) therefore, the discriminating public, standing in the middle of the street at the imminent risk of its valuable life, will look at his windows, then look at yours, and, seeing your sign will decide without the slightest hesitation that you *must* be the better man, and straightway make a dash for your entrance. Self-elevation, in his sense, is inseparable and indistinguishable from selfishness, and not far removed from greed.

''This section (3) means that you cannot pay anything to anybody for bringing or referring a patient to you; that you cannot accept anything from anybody for patients referred by you to some other practitioner; it means that you cannot take a ''rake-off'' from your druggist for the business that he does on the strength of your prescriptions or recommendations; all this is 'unprofessional' and therefore degrading. So much for the 'letter' interpretation of this section.

"However, in becoming members of the Chicago Dental Society we pledge to conduct ourselves in accord with the Code of Ethics both in the 'letter' and in the 'spirit.' Let us interpret this section from the 'spirit' angle.

"In this light it means that you should not resort to a subterfuge to do any of the things just mentioned, all of which are literally so clearly set forth as violations in Section 3. For instance, one's wife or any other member of his family cannot accept cash, check for cash or presents from any specialist as a return 'favor' for his patronage. The same applies to the case of the druggist. Any evasion of the intent of the Code is a violation.

"Again, it means that one should not besmirch his name by knowingly allowing its use for the promotion or sale of stock (almost always worthless) or merchandise of any kind for a reward in any form; that one should not have his office young lady soliciting his patients for the sale of dental toilet articles. (One's diploma should not be used as a vendor's license.)

"Furthermore, it means that a specialist, self-announced, and acknowledged and accepted as such by the profession at large, who practices nothing but his specialty, himself, but who has in his office a man or men who practice general dentistry, the patients being furnished by the specialist, he, the specialist, is guilty of a violaton of Section 3 in that he receives a portion of the fee for work referred by him to another practitioner, the fact that that practitioner is in the specialist's own office having no influence on or excuse for this offense.

"We know that this has been done for over twenty-five (25) years and is being done today by some of the 'top notchers' in the profession, but, nevertheless, it is splitting fees—splitting fees as effectually as is done by the extractor or x-ray man when he sends 25 per cent of his fee to some inconsequential little fellow in the outlying districts of the city for work referred to him.

"We have a group of men who have entered the field of radiography—graduates of dentistry, earnest men who have had many years of experience in general practice which in their new work is of incalculable value—who are members of our Society for years and who observe the Code of Ethics to the last comma and period—who are always ready to give of their time and their valuable knowledge to instruct and enlighten us, individually or collectively.

"Then we have another group of x-ray 'specialists' who have none of these laudable qualifications—they are *not* graduates, therefore cannot be members of the Society—their knowledge of the x-ray work is chiefly how to make an exposure and develop the film—they know very little or nothing about the anatomy or pathology of the oral cavity (this does not prevent them from issuing diagnoses with every case that just bristle with authority and profound knowledge), and lastly, they are almost always fee-splitters. Unfortunately, these parasites, about fifty (50) in number, we are told, are at present within their legal right there being no state supervision of x-ray operators, strange as it may seem! Pending the proper laws which will correct this physically dangerous (to the patient) as well as unjust situation,

we can do a great deal to ameliorate this evil by sending our work only to *graduates,* and, graduates in dentistry, who are capable of giving your patient the best service. Won't you ascertain at once to which group 'your' man belongs, and if through thoughtlessness you have been referring your work to one of this second group of fifty, rectify the injustice by affiliating without delay with one of the splendid fellows who compose the first group?''

This is a gratifying endorsement of radiodontia and the principles which this department endeavors to champion. Now let the Board of Censors follow a consistent and obligatory course by censoring or suppressing the advertisements in *The Bulletin* of the x-ray laboratory which persistently claims superiority in location, facilities, skill and service, and inserts cuts of the building and operating room with a ''pajamaed'' attendant. It has been reported that some influential members of the Chicago Dental Society are financially interested in this laboratory, but there should be no discrimination between ''commissioners'' and promoters, and the bigger they come the harder the fall when Dr. Jelinek draws a ''bead'' on them. A laboratory is no less commercial for having licensed operators, if it is conducted on unethical principles and commercial methods are used to attract patronage. Dr. Raper contends that corruption is a more exact word in this connection than commercialization, but this will be answered in a subsequent issue.

The nauseating parrot prattle which this laboratory publishes in *The Bulletin* is a glaring injustice to the ethical radiodontists in Chicago, and an affront to the intelligence of the members of the Chicago Dental Society.

With pertinent comment, here are accurate quotations from a just few of the crudities which this laboratory has been permitted to publish under the sanction of the Chicago Dental Society:

''Sinus infections, whether in the acute or chronic stage, are readily localized by our radiographs.''

A ridiculously extravagant claim except by a clairvoyant!

''Our well-made radiographs contains a mass of important detail which cannot all be appreciated by the naked eye.''

The ''mopupus'' must write the copy with ''radiographs contains'' and ''which cannot all be,'' appearing in it.

''With a location, central convenient and easily reached by auto or elevated or surface cars.''

Presumably an advantage shared by no one else. How like an installment furniture store, and lacking only a ''puller'' on the sidewalk to equal the cast-off-clothing dealer.

''Consistent with its policy of securing best results, regardless of time or trouble, the ——— X-ray Laboratory makes use frequently of two-angle films when there is any doubt as to film interpretation.''

Huh? When you get the drift of this jargon, ''makes use frequently of two-angle films'' is intended as a boast of sometimes showing two aspects of a region. An honest, competent radiodontist *never* does *less.*

''The ——— X-ray Labratory offers you better radiographic service than you can obtain elsewhere.''

A bumptious conceit significant of ignorance, and reminiscent of the anecdotical consequences of taking in too much territory!

"Interesting specimens from our enormous collection of dental films will be on exhibit at our laboratory every day during the annual convention." "Radiographs of the rarer dental and osseous lesions and other clinical curiosities are available in greater profusion probably than in all the existing atlases of dental radiography taken together."

After coming up for air and a comma, it may not be amiss to remark that if the "specially trained personnel" are members of the Chicago Dental Society (and many incongruities prevail in such a large city), why not contribute this stupendous exhibit to the clinical program of the annual convention? If it is a commercial enterprise supported by Chicago dentists, why not buy exhibit space at the convention and solicit business along with the other by-product mongers.

These examples do not tell you the half of it; read the advertisements of this laboratory each week for a laugh, and imagine intelligent professional men "falling for" the burlesque ballyhoo. Fearing the motive of protest being misconstrued, men often endure imposition in silence, but the ethical men practicing the specialty in Chicago should not have tolerated this material in the official organ of their society.

In closing it may be said that in view of the attitude of the dental profession toward oral radiography and diagnosis, the few men who are devoting their lives to establishing radiodontia as an honored speciality are gluttons for punishment, and fools unless there is a day of reckoning and readjustment approaching.

ABSTRACT OF CURRENT LITERATURE

Covering Such Subjects as

ORTHODONTIA — ORAL SURGERY — SURGICAL ORTHODONTIA — DENTAL RADIOGRAPHY

It is the purpose of this JOURNAL to review so far as possible the most important literature as it appears in English and Foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.

Some Considerations of Vitamines. A. Lumière (Paris). Revue de Stomatologie, October, 1922, xxiv, 10.

The distinguished laboratory chemist, whose versatility is well known, takes up the vitamines from some of the more unusual viewpoints. In alluding to the power of the simplest cells to synthetize foreign matter, he cites the example of a mould growing in a medium containing sulphuric acid. These cells use the carbon of the carbonic acid and the nitrogen both from the air, the hydrogen and oxygen of the solution, and the sulphur from the sulphuric acid addition, with some of the dust of the air (cellulose), to build up the most complex organic molecules. All living matter is similarly built up from the surrounding heterogeneous elements of the most simple character. The resulting substance is colloidal—composed of particles known as micelles which have an insoluble center with a perigranular envelope which is soluble. This may be extremely thin, although sufficient to ensure the colloidal state.

Maze has succeeded in growing maize grains in a solution containing only mineral matter—fifteen separate mineral substances in varying concentration. Jointly these substances contain carbon, oxygen, hydrogen, nitrogen, phosphorus and so on—everything necessary for growth. All of these crystalline substances are synthesized into colloids. The latter vary as we ascend the scale from simple to complex creatures, and at a certain stage of evolution the vitamine substances appear.

Before reaching this point it is of course evident that some of the minerals must be present in certain quantities, else the vital processes suffer and nutrition, growth and development will be interfered with. The question of what is absolutely necessary in the mineral kingdom is however still unsettled. These are then the most primitive growth factors and as has been shown it is possible to sustain low organisms entirely by this means. Next in complexity come the proteins. It is not enough to state merely that albumin is a necessity for existence. It is the crystalline end product of albumin digestion which we mean. While in theory any one of the aminoacids should be as good as another, and whereas once they were thought to be of a com-

mon food value, we now know that some are quite indispensable for growth and nutrition, while others are quite inert. Herein protein differs radically from carbohydrates, for the latter can be substituted for one another indifferently in feeding experiments and rationing. The special aminoacids are then the second line of indispensable growth factors.

There is a third line, substances which we call the vitamines which are indispensable to the lives of the higher vertebrates, at least during the growth period, the complete withdrawal of which from the diet can cause well marked diseases. Very minute quantities only are necessary to fulfil their functions. They are not the same for all animals; thus pigeons have thrived on a diet which cannot sustain rats. The subject of vitamines is becoming increasingly complex with the advance of laboratory activity and the final conclusions will probably be quite unlike our present day deductions. Thus today the vitamines seem to exert at least two quite different types of function. Statically they seem necessary to the makeup of the colloid molecule, while dynamically they function somewhat like the hormones, affecting nutrition by stimulating the cells of external secretion.

Unerupted and Impacted Teeth a Cause of Serious Eye and Ear Conditions. J. A. Stucky (Lexington, Ky.). The Eye, Ear, Nose and Throat Monthly, November, 1922, i, 10.

The author relates three brief case histories as follows: A woman of 20 consulted for irritative irido-cyclitis which was relieved by the usual measures. Later the clinical picture of acute glaucoma developed with fulminant symptoms which required an immediate iridectomy without much relief, and in a few days irido-cyclitis and glaucoma returned. An enucleation of the bulb seemed indicated, but in the meantime a stereoscopic roentgenogram revealed an unerupted wisdom tooth on each side. Following their extraction the eye lesions immediately improved without recurrence. 2. A woman of 28 had among other troubles hypermetropic astigmatism, and headaches, the latter attributed to nervousness and tachycardia. Both her thyroid and appendix had been ablated. An x-ray of the teeth revealed unerupted wisdom tooth to the right and impacted wisdom tooth to the left. The visual troubles and headaches promptly vanished after removal of these teeth. 3. Woman, 39, presented symptoms suggestive of chronic mastoiditis. There was a history of otorrhea in childhood. It was decided that the mastoid trouble was of neurotic nature. The lower wisdom teeth were found unerupted and their removal was followed by complete subsidence of the aural symptoms. In these cases pain is not felt at the site of the impaction and the reflex troubles are set up somewhere in the region of the trifacial. In such cases the interpretation of ordinary dental plates is usually negative. Stereoscopic plates should not be necessary, however, as it is possible to obtain a satisfactory ordinary plate by a technic briefly mentioned by the author which was suggested to him by an expert. This he evidently has not yet tested.

The Building of Good Teeth and Their Preservation. H. Scurfield (Sheffield, Eng.). The Journal of State Medicine, November, 1922, xxx, 11.

The teeth of the British nation are becoming more defective, which fact is brought into relationship with urbanization, which makes it necessary to use foods which keep well and can be moved. This involves increased consumption of highly milled flours, canned goods, sugar, etc., judged from the effects of a change to this diet among aboriginal peoples. Dentists are agreed that the jaws are smaller than once, as the result of insufficient mechanical exercise. If this line of speculation is justified we should return to a diet of fresh vegetables, fruits, milk, animal fats and eggs, which articles enable us to obtain a sufficiency of all the vitamins, this being especially desirable during the growth-period and in prospective and nursing mothers. Other articles, beginning with the weaning period, should be selected because they compel mastication and thus give the jaws a good amount of exercise in the developmental period. The development of the upper jaw is additionally affected unfavorably by mouth-breathing, which at the same time interferes with the development of the nasal passages. By cutting down the number of times food is taken, the risk of decay is correspondingly lessened. Three good meals daily, followed by mouth-cleansing, will secure a clean mouth, and certain foods are called cleansing—apples, oranges, celery, lettuce, toast, etc., if eaten at the close of the meal tend to leave the teeth in good shape, while sweet things are apt to cling to the teeth. The old custom of sweet desserts seems ill-founded from this viewpoint.

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EDITORIALS

Should Dentistry Use a Scientific Nomenclature?

AT the request of the Chairman of the Committee on Dental Nomenclature, we are publishing a report which was presented to the House of Delegates at Los Angeles, and unanimously received and adopted.

The report of this Committee shows that they have spent considerable time on the subject and some of the words recommended will undoubtedly serve to eliminate much of the confusion that has existed.

However, certain parts of the report seem to indicate that the Committee believes that Dentistry did not need a scientific nomenclature and that words should be used which had become common in the profession even if employed incorrectly. Some of the recommendations made are in direct contradiction to words as used in other sciences. It may be perfectly proper for dentists to coin words and use terms which are purely dental, but when they attempt to make anatomical interpretations they should at least, use words which are

accepted by anatomists. If they do not accept words which are standard in other sciences, they should at least, give some reason which is more scientific than to simply state that a term is preferable.

The Committee states: "We cannot afford to disregard the nomenclature of other sciences in forming our own, and while there are instances in which we have by determined effort, succeeded in establishing the use of some words which have conflicted with their use in other sciences, we do not feel that it is worth the effort and the resulting confusion consequent thereto."

In referring to the word "mandible," the Committee states that: "* * * it has caused much confusion in anatomical nomenclature, for the reason that the nomenclature of the teeth, jaws and surrounding parts has been built around the word 'maxillary.' * * *" We are willing to admit that we do not possess the intelligence to follow the reasons of such a statement quoted from the report of the Committee; for anatomically speaking, we can conceive of nothing more unscientific or confusing to a group of men who are versed in anatomical terms, than to describe "mandibular" conditions and parts by using the word "maxillary."

The reason which the Committee gives for preferring "cuspid" and "bicuspid" to "canine" and "premolar" is so unscientific that it would be ridiculous to even consider it if the report had not received the sanction of the House of Delegates of the American Dentists Association.

In using the words "mesial" and "distal" the Committee admits that the term does not conform with "anatomical nomenclature." Nevertheless, they recommend that the Dental profession continue using them. We believe it would be much better to admit the terms were incorrectly used and replace them by words which have a positive and recognized meaning in other sciences, and thereby not only avoid confusion in Dentistry, but show to the world that dentistry is big enough to admit it has made a mistake and not be small and biased and continue using incorrect terms and hold the science up to ridicule before other scientific bodies.

We will suggest that the next Committee on nomenclature that attempts to consider anatomical terms be willing to admit that anatomists probably know more about anatomy than dentists do, and therefore accept terms which have a scientific meaning and not recommend words which the Committee admits are used incorrectly.

Physiological Chemistry*

IT IS very important that the dentist possess definite knowledge in regard to the action of certain foods from a chemical and systemic standpoint. Physiological chemistry then becomes a very important subject with which the practitioner of dentistry should be familiar.

The work of Pettibone is not so ultra-scientific but that the average reader can understand it. A brief review of the different elements and

*Physiological Chemistry. By C. J. V. Pettibone, Ph.D. Assistant Professor of Physiological Chemistry, Medical School University of Minnesota. Published by C. V. Mosby Co., St. Louis. Price $3.25.

various carbohydrates are given the consideration to which they are entitled. Fats and allied foodstuffs are also considered from a chemical as well as a physiological standpoint and the proteins come in for a similar study.

Of particular interest to the dental profession is the chapter on some familiar foodstuffs and the changes which take place in these substances by different methods of cooking.

The chapters on digestion and on metabolism are ones which require more than passing notice of the dental profession at the present day.

A Letter from Dr. Virgil Loeb

Editor of THE INTERNATIONAL JOURNAL OF ORTHODONTIA, ORAL SURGERY AND RADIOGRAPHY:

May I not commend you for the publication of Dr. C. O. Simpson's thoughts on the present day dangerous vogue of stressing the artificialities and nonessentials of dentistry, which appeared in the October, 1922, number of your Journal on pages 671 and 672.

If the dental profession allows itself to grow callous to "cuckoo windows" and "overstuffed rose or turquoise carpets," it will only be a matter of time when many noble and worth-while traditions are dragged into the stifling dust of ornate commercialities.

In all seriousness, it seems to me to be as much the duty of our profession to protest against undesirable and destructive advertising by commercial houses as it is the set purpose of some commercial supply houses to insist upon their inherent right to spread any type of advertising propaganda. Dentistry can be kept clean only by the display of such admirable courage as your Journal shows in giving prominence to the healthful criticism of Dr. Simpson.

Very truly yours,

(Signed) Virgil Loeb.

December 19, 1922.

Applied Orthodontia*

"APPLIED ORTHODONTIA" is the title of a book by James D. McCoy of Los Angeles which has just made its appearance.

Dr. McCoy as an author is not entirely new in the dental field as he was connected with the *International Journal of Orthodontia and Oral Surgery* as editor of the radiographic department and also prepared a book on radiography which was published several years ago. This is his first attempt towards writing a book on orthodontia.

A careful perusal shows that the book differs very little from others which have made their appearance in the past few years. Dr. McCoy has long been an enthusiastic advocate of modelling compound for taking im-

*"Applied Orthodontia." By James D. McCoy, M.S., D.D.S. Illustrated with 206 engravings. Published by Lea & Febiger, Philadelphia and New York. Price $4.00.

pressions and his technic describing the use of this material for orthodontic purposes is probably the only one new feature of the work.

The first chapter describing the object and scope of orthodontia is very well written and gives a general outline of the problems of orthodontia as they exist today.

The second chapter describes the growth of masticatory apparatus in relation to the teeth and arches in normal occlusion and forces governing occlusion. This chapter is very similar to the one which appears in Angle's work on orthodontia and several definitions have been taken from Angle's seventh edition. We notice in this chapter that the use of the terms "incline planes" and "inclined planes" are used synonymously. We have long believed that a cusp possessed an inclined plane, regardless of the tendency of men in the dental profession to speak of it as an incline plane.

Under malocclusion we find the author has used the same terminology as employed by Angle several years and even to the extent of using the term "torso occlusion." It will be quite interesting for the reader to look up the meaning of "torso" as defined in a standard dictionary and then decide whether the use of the term is applicable to describe positions of malocclusions.

The author has refused to acknowledge the terminology adopted by the American Society of Orthodontists a few years ago, in the description of the positions of malocclusion and also refuses to take recognition of the fact that even more modern terms have been suggested to describe the positions of malocclusion than those which are used by the American Society of Orthodontists. It seems to us as though the dental terminology employed in "Applied Orthodontia" is no further advanced than it was when Angle published his seventh edition and his plan for the classification of malocclusions. The same arrangement as was employed by Angle is shown, regardless of the fact that many men have recognized the weakness and deficiency of this plan of classification.

The author still insists upon using the terms "mesio-distal relations" of the teeth and dental arches when it was quite well agreed among men who have made a study of this phase that mesial and distal do not describe the relation of arches as they exist, when we are attempting to classify malocclusion. He also continues to lay great stress on the position of the first permanent molar as the "key in the classification of malocclusion" when many writers, and especially Hellman, have shown that the position of the first molar is faulty as a basis of arch relations.

We also find the author refuses to recognize the adopted terminology of mandibular and maxillary as being preferable to upper and lower in describing teeth. This refusing to recognize the adopted terminology is also present in the description of appliances in which we find such words as "labial arch wire" which is extremely faulty because it should be either "labial arch" or "labial wire."

Again we find the new and old terminology is used together because we find the author speaks of groups of teeth as consisting of cuspids and

premolars. If he is going to use the obsolete term cuspid, he should also say bicuspid, if he is going to use the word premolar he should employ it with canine.

We find the chapter dealing with etiology of malocclusion is probably one of the best chapters in the book because he has taken into consideration certain of the ductless glands, especially the pituitary and thyroid. However, the attention given to endocrinology is entirely too little as compared to the importance of the subject today. Also, insufficient attention is paid to malnutrition as related to the production of malocclusion.

The chapter on the nose and throat is quite well written and has several valuable illustrations.

Chapter 7 is devoted to abnormal muscular habits, and while we all recognize that habits play quite a part in the production of malocclusion, it has long been our belief that they are more often the result of something else, rather than the cause of any serious condition.

Chapter 8 is devoted to the consideration of hereditary and congenital factors of malocclusion in which the author reviews some of the prominent works on heredity and cites a number of valuable authorities.

In Chapter 10, we find the author has recognized some of the work that has been done in the past towards predetermining the dental arch. He quotes from Hawley and Gilpatrick and describes their methods in detail, but seems to be unfamiliar with the work that has been done by Stanton, Hanau and Fish with relation to arch predetermination. A careful review of the work of Hawley and Gilpatrick has long ago proved that it was by no means scientific because both of them have had a preconceived idea around which they tried to establish the predetermination of the dental arch. It is very unfortunate that a modern work on orthodontia should publish methods of arch predetermination which have so little scientific value in the face of the fact that more scientific work has been done by other investigators.

The chapter on radiography is extremely well written and is by far the most original and valuable part of the text book.

The chapter devoted to tissue changes relating to the movements of the teeth has been copied from the work of Oppenheim, and the fact remains that a work on orthodontia should be orthodontia and not histology. Therefore, we question whether such a chapter as this belongs in a book the title of which is "Applied Orthodontia."

The various types of regulating appliances are reviewed as well as a consideration of some of the types of anchorage. The labial alignment wire receives a large amount of consideration which is creditable, because it is the basis of all regulating appliances and is useful in showing different types of anchorage.

We find a few illustrations of the removable lingual wire as adopted by Dr. Mershon and a very incomplete description of the soldered lingual wire which has been used so satisfactorily by Dr. Lourie and others. Most of the illustrations showing the use of appliances are pen and ink drawings

which are satisfactory as far as drawings are concerned, but we believe the work would have been improved if actual photographs of the appliances had been employed.

In the portion of the book devoted to the application of appliances, the author has grouped certain teeth which seems to indicate that more attention has been given to the treatment of the individual positions of malocclusion than to a general consideration of conditions. The work on appliances is incomplete because it fails to mention the valuable use of the soldered lingual wire in conjunction with the high labial wire as employed by Dr. Lourie and as is used by many other practitioners today. The tendency of other men is to use appliances that are inconspicuous while the illustrations shown by Dr. McCoy indicate that in his practice, inconspicuousness plays very little part. This statement is made because the labial alignment wire is employed so frequently. Practically nothing is given on the modern forms of appliances. Such well-known principles as are shown in the removable regulating appliances as employed by Dr. Jackson and later advocated by Dr. Crozat are given no recognition in McCoy's work.

Hawley's retaining appliance is given considerable prominence. It, however, is a type that has received recognition only by Dr. Hawley and used by very few other men.

Roger's work of muscle training is also featured. This is another theory that has not received endorsement from prominent anatomists and physiologists.

The book as a whole is one that is very interesting and should be in the library of any man who is practicing orthodontia because many ideas will be obtained from the study of it.

Oral Roentgenology*

IT IS very seldom that we are asked to review a book in which it is necessary to begin the review with a criticism. We have before us an excellent work on Radiography by Dr. Thoma of Boston which he has named "Oral Roentgenology."

During the last few years there has been a tendency among scientific men to drop those terms which are coined from personal names and "Roentgenology" is no exception to the rule. The criticism which we are mentioning of the term "Roentgenology" is also apparent in the part of the work which deals with nomenclature.

At the beginning of the first chapter the author states that the terms employed were adopted by the American Roentgen Ray Society on October 1, 1913. The fact that the terms were adopted in 1913 is sufficient reason for their not being employed at the present time, owing to the fact that conditions have arisen since that time in the scientific world to further dis-

*Oral Roentgenology. By Kurt H. Thoma, D.D.S., Boston, Mass., Member of the Research Committee of Harvard University. Second edition revised and enlarged, 475 illustrations. Published by Lea & Febiger. Price $6.00.

credit their use. It is very unfortunate that a book that contains so many excellent features should employ terms that are obsolete and which are not used by many authorities on radiography today.

The work takes up the consideration of various means of producing the rays, including a consideration of the machine and different types of tubes employed. In fact the radiographic technic as shown in Part 1 is very complete.

The interpretation of the radiogram is also considered, as well as the different positions of the patient, which should be very valuable to the individual who is taking up the study of radiography.

The third chapter should be carefully studied because it is given over to the consideration of the normal appearance of the tissue as the result of radiographic findings. As strange as it may seem, the average man who takes up radiography gains his knowledge of normal anatomy from the study of pathological conditions, i.e., the operator is more concerned with finding the pathological manifestations than he is with the normal. Consequently we often find an incorrect diagnosis, which has been made because the operator lacks knowledge of the normal appearance of the structures as they are found in different individuals at different ages.

Another part of the book shows the development of the tooth at different ages and the appearance of the maxilla and mandible as well as the sinuses as found in children and adults. We also find illustrations of the maxilla and mandible with radiograms of those structures made for the purpose of comparison. Impacted teeth are shown in the macroscopical specimen and are later radiographed for comparison.

The book is profusely illustrated and printed on excellent paper which brings out the appearance of the illustrations very nicely. With the exception of the terminology employed the book is an excellent contribution to the science of radiography.

ORTHODONTIC NEWS AND NOTES

Actinomycosis

To the Editor:—I am endeavoring to make a complete study of the distribution of human actinomycosis in this country. The number of cases reported in the literature is surprisingly small, and I know that the disease is not so rare as is sometimes thought. I shall greatly appreciate hearing directly from any one who has had experience with this disease, and desire to know concerning case histories the following: age, sex, occupation, residence, state in which the disease was contracted, location of lesion, duration of symptoms, and any special points of interest connected with the treatment, outcome of the disease, or necropsy findings.

A. H. Sanford, M.D., Mayo Clinic,
Rochester, Minnesota.

Dec. 9, 1922.

Notes of Interest

Dr. C. R. Mooney announces the opening of an office at 402 Insurance Building, Madison, Wis. Practice limited to orthodontia.

Dr. Henry J. Toomey announces the opening of an office for the exclusive practice of orthodontia at 721 Rose Building, East Ninth at Prospect, Cleveland, Ohio.

Dr. Carleton W. Woods announces the removal of his office to 34 East 51st Street, New York. Practice limited to orthodontia.

Mr. and Mrs. Anderson Wright Kelley announce the marriage of their daughter Venadys Atkinson to Dr. Charles Heston Patton on Saturday, December the ninth, 1922, Fairhaven, Mass.

Dr. Norborne F. Muir announces the removal of his office from the Payne Building to 713 Anchor Building, Roanoke, Va. Orthodontia exclusively.

Dr. Burt Abell, Toledo, Ohio
President of the American Society of Orthodontists, 1922-1923